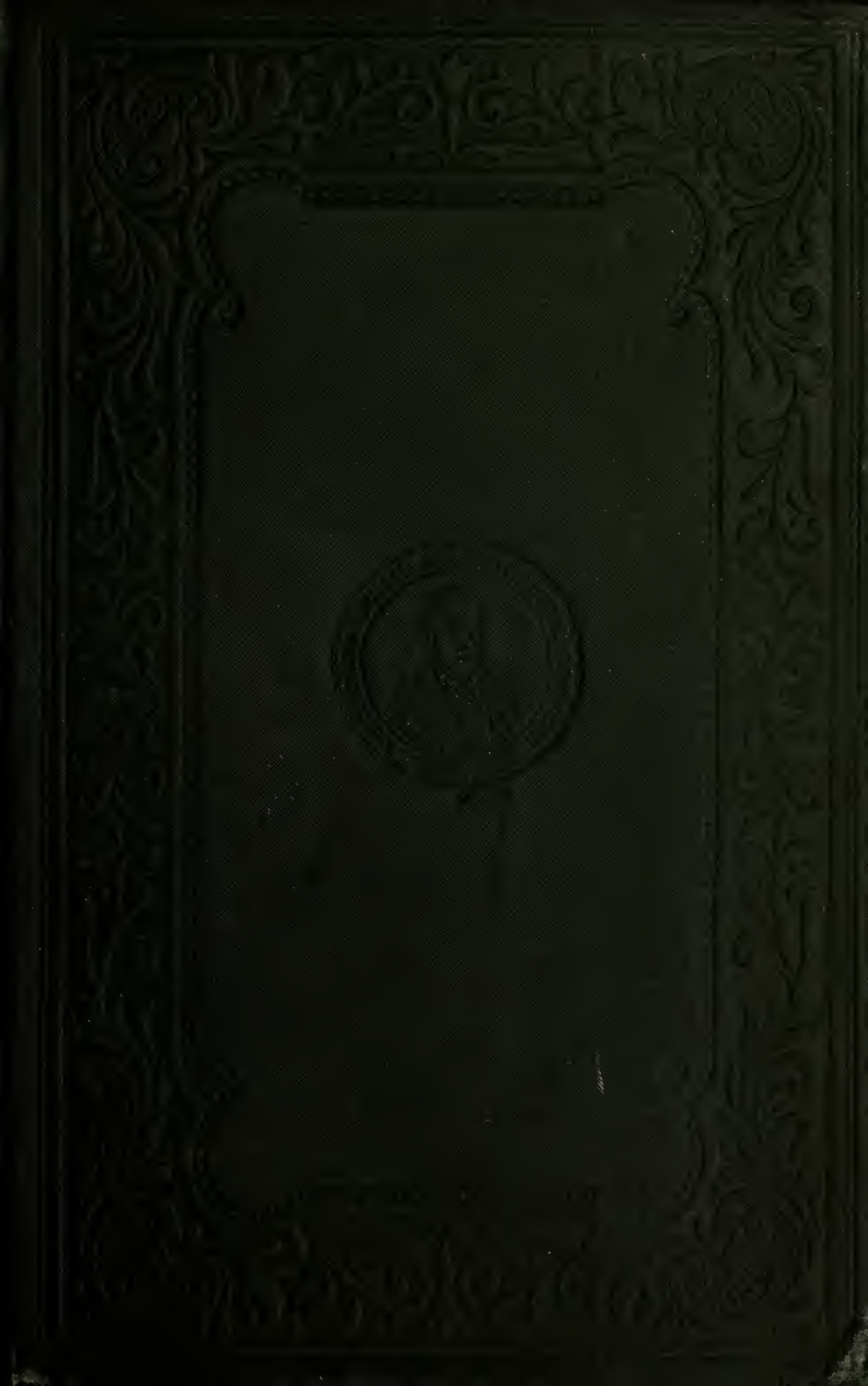

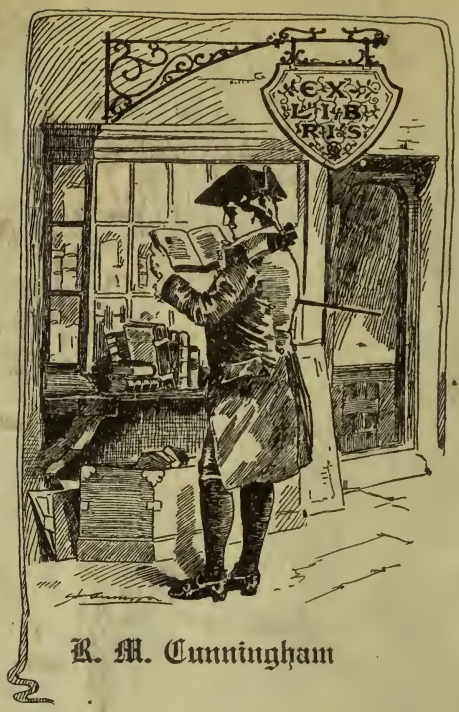

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VOLUME II.

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1889.—PRICE, JOSEPH, A.M., M.D. Visiting Surgeon to the Gynecian Hospital; Physician in Charge of the Preston Retreat; Physician in Charge of the Obstetrical and Gynecological Department of the Philadelphia Dispensary; Fellow of the American Association of Obstetricians and Gynecologists. Philadelphia, Pa.

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Founder.—Taylor, Hugh M., M.D. Secretary of the Virginia Board of Medical Examiners. Richmond, Va.

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CONSTITUTION.

ARTICLE I.

The name of this Association shall be THE SOUTHERN SURGICAL ASSOCIATION AND GYNECOLOGICAL ASSOCIATION.

ARTICLE II.

The object of this Association shall be to organize the profession of the South in the most efficient manner possible for the advancement of the sciences of surgery and gynecology.

ARTICLE III.

This Association shall adopt and conform to the Code of Ethics of the American Medical Association.

ARTICLE IV.

Any reputable physician, who practises surgery or gynecology, and who is vouched for by two members of the Association, and recommended by the Judicial Council, shall be eligible to membership in this body.

ARTICLE V.

SECTION 1. The officers of this Association shall be a President, two Vice-Presidents, a Secretary and a Treasurer, and a Judicial Council, elected by ballot, without nomination.

SEC. 2. The President and Vice-Presidents shall be elected for one year, and the President shall not be eligible for reëlection at any time; the Secretary and Treasurer, each, for five years, and the Judicial Council as provided for in the By-Laws.

ARTICLE VI.

SECTION 1. It shall be the duty of the President to preside at all meetings of the Association, when present; to give the casting

vote; to see that the rules of order and decorum be properly enforced in all deliberations of the Association; to sign the approved proceedings of each meeting, and to approve such orders as may be drawn upon the Treasurer for expenditures ordered by the Association.

SEC. 2. In the absence of the President the first Vice-President shall preside, and in his absence the second Vice-President shall preside.

SEC. 3. In the absence of all three, the Association shall elect one of its members to preside, *pro tem.*

SEC. 4. It shall be the duty of the Secretary to keep a true and correct record of the proceedings of the meetings; to preserve all books, papers, and articles belonging to the archives of the Association; to attest all orders drawn on the Treasurer for moneys appropriated by the Association by the seal of the Association; to keep the account of the Association with its members; to keep a register of the members, with the dates of their admission and places of residence. He shall collect all moneys due from the members, and pay to the Treasurer, taking his receipt for the same. He shall report such unfinished business of previous meetings as may appear on his books requiring action, and attend to such other business as the Association may direct. He shall also supervise and conduct all the correspondence of the Association, and be chairman of the Publishing Committee.

SEC. 5. It shall be the duty of the Treasurer to keep a correct record of all moneys received from the hands of the Secretary, giving his receipt for the same; pay them out by order of the Association, as indorsed by the President, and attested by the seal in the hands of the Secretary.

SEC. 6. It shall be the duty of the President of the Association to appoint a Committee of Finance, consisting of three members of the Association, whose duty it shall be to examine the books of the Secretary and Treasurer, and report on the same at the next session of the Association.

ARTICLE VII.

Vacancies occurring in the officers of the Association shall be filled by appointment of the President until the next meeting.

He shall also have the appointment of all committees not otherwise provided for.

ARTICLE VIII.

This Constitution shall take effect immediately from the time of its adoption, and shall not be amended except by a written resolution, which shall lie over one year, and receive a vote of two-thirds the members present.

BY-LAWS.

ARTICLE I.

The Southern Surgical and Gynecological Association shall meet annually on the second Tuesday of November, at 10 A.M., at such place as may be designated by the preceding meeting.

ARTICLE II.

The members present shall constitute a quorum for business.

ARTICLE III.

The President shall call the meeting to order; cause the minutes of the previous meeting to be read by the Secretary, which, after correction, shall be adopted.

ARTICLE IV.

The annual dues of each member shall be $10, paid in advance.

ARTICLE V.

The usual parliamentary rules governing deliberative bodies shall govern the business workings of this Association.

ARTICLE VI.

All questions before the Association shall be determined by a majority of the votes present.

ARTICLE VII.

The President shall deliver an annual address at each meeting of the Association.

ARTICLE VIII.

The President shall appoint fifteen members, each of whom shall prepare and read an essay or lecture upon some subject of his own selection; the subjects of said essays or lectures being made known to the Secretary, and by him to each member of the Association, within the first three months after the adjournment of the Association.

ARTICLE IX.

The Secretary of the Association shall receive, at each annual session, a draft from the President, drawn on the Treasurer, for the sum of $100 for services rendered the Association, and to this shall be added the necessary expense incurred in the discharge of his official duties.

ARTICLE X.

It shall be the duty of the Secretary, one month prior to the annual meeting, to notify by circular letters the members of the Association, and urge their attendance.

ARTICLE XI.

The authors of all voluntary essays shall notify the Secretary, six weeks prior to the meeting, of the titles of their essays, so that they may be incorporated in the circular letter to the members.

ARTICLE XII.

JUDICIAL COUNCIL.

The Judicial Council shall consist of five members; and of those elected at the primary meeting, the first shall serve five years, the second four, the third three, the fourth two, and the fifth one year; so that subsequently one member of the Council shall be elected annually to serve five years.

This Council shall organize by electing a Chairman and Secretary and shall keep a record of its proceedings.

The duties of this Council shall be—

1. To investigate applications for membership and report to the Association the names of such persons as are deemed worthy.

2. To take cognizance of all questions of an ethical, judicial or personal nature, and upon these the decision of the Council shall be final; *provided* that appeal may be taken from such decision of the Council to the Association, under a written protest, which protest shall be sustained by the Association, and the matter shall then be referred to a special committee, with power to take final action.

3. All motions and resolutions before the Association shall be referred to the Judicial Council without debate, and it shall report by recommendation at as early an hour as possible.

ARTICLE XIII.

The following are the standing committees of the Association to be filled by the President, and to report at the next annual meeting subsequent to their appointment, viz.: Committee of Arrangements and Committee of Publication. The Committee of Publication shall consist of three members, one of whom, the Secretary of the Association, shall also be the Chairman of the said committee. The Committee of Arrangements shall consist of five members.

ARTICLE XIV.

The Committee of Publication shall have full power to omit from the published transactions, in part or in whole, any paper that may be referred to it by the Association, unless specially instructed to the contrary by the Association, which will be determined by vote.

ARTICLE XV.

No honorary members shall be placed upon the roll of this Association.

ARTICLE XVI.

Any member failing to pay his dues for more than one year shall be suspended.

ARTICLE XVII.

Every physician, making application for membership, shall present with his application a paper on some surgical or gynecological subject.

ARTICLE XVIII.

No paper shall be read before this Association which does not deal strictly with a subject of surgical or gynecological importance.

ARTICLE XIX.

No paper read before the Association shall be published in any medical journal or pamphlet for circulation, as having been read before the Association, without having received the indorsement of the Committee of Publication.

ARTICLE XX.

The reading of papers shall be limited to twenty minutes each, except by permission of the Association.

MINUTES OF THE PROCEEDINGS

AT THE

SECOND ANNUAL MEETING

OF

THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION,

HELD IN THE

SENATE CHAMBER OF THE CAPITOL,

Nashville, Tennessee,

NOVEMBER 12, 13, AND 14, 1889.

SECOND ANNUAL MEETING.

The following-named Members were present:

BLANKS, J. H.	Nashville, Tenn.
BROKAW, A. V. L. . . .	St. Louis, Mo.
BRIGGS, W. T.	Nashville, Tenn.
BROWN, BEDFORD . .	Alexandria, Va.
BUIST, JOHN R. . . .	Nashville, Tenn.
CAIN, JOHN S.	Nashville, Tenn.
CALDWELL, W. H. . . .	Lexington, Ky.
COCHRANE, HARDIN P. .	Birmingham, Ala.
CUNNINGHAM, R. M. . .	Pratt Mines, Ala.
DAVIS, J. D. S.	Birmingham, Ala.
DAVIS, W. E. B. . . .	Birmingham, Ala.
DOUGLAS, RICHARD . .	Nashville, Tenn.
ENGELMANN, GEORGE J. .	St. Louis, Mo.
EVE, DUNCAN . . .	Nashville, Tenn.
EWING, WM. G. . . .	Nashville, Tenn.
GLENN, W. F.	Nashville, Tenn.
HADRA, B. E.	Galveston, Texas.
HAGGARD, W. D. . . .	Nashville, Tenn.
HARDON, VIRGIL O. . .	Atlanta, Ga.
HOGAN, S. M.	Union Springs, Ala.
JOHNSTONE, ARTHUR W. .	Danville, Ky.
Le GRAND, JOHN C. . .	Anniston, Ala.
LETCHER, J. H. . . .	Henderson, Ky.
LYDSTON, G. FRANK . .	Chicago, Ill.
McGUIRE, HUNTER . .	Richmond, Va.
McMURTRY, L. S. . . .	Louisville, Ky.
McRAE, F. W.	Atlanta, Ga.
MATHEWS, J. M. . . .	Louisville, Ky.
MAURY, R. B.	Memphis, Tenn.
NICHOL, W. L.	Nashville, Tenn.
OWEN, A. M.	Evansville, Ind.

PENDLETON, JOHN E. . .	HARTFORD, KY.
POTTER, W. W. . . .	BUFFALO, N. Y.
PRICE, JOSEPH . . .	PHILADELPHIA.
ROBERTS, WM. O. . . .	LOUISVILLE, KY.
ROBINSON, WM. L. . . .	DANVILLE, VA.
STEVENS, J. B. . . .	NASHVILLE, TENN.
STONE, I. S.	LINCOLN, VA.
WATHEN, W. H. . . .	LOUISVILLE, KY.

Letters or messages of regret were received from a large number of Members who were prevented from attending the meeting.

FIRST DAY—*Tuesday, November* 12, 1889.

Morning Session.—The meeting was called to order at 10 A.M. by the President, Dr. Hunter McGuire, of Richmond, Va. Divine blessing was invoked by the Rev. R. L. Cave.

The Association then listened to the report of the Committee of Arrangements, which was made through its Chairman, Dr. J. R. Buist, of Nashville, who said that the only change from the printed programme would be that the Association instead of meeting in the Senate Chamber would convene in the Broad Street Museum Hall in the evening, when an address of welcome would be delivered by the Hon. A. J. Caldwell, a response to which would be made by Dr. J. M. Mathews, of Louisville.

The Committee further suggested omitting the afternoon session of the second day, fearing three sessions would be onerous, and urged an evening session of that day instead, which was not accepted.

The Chairman of the Judicial Council, Dr. John S. Cain, of Nashville, asked for further time to make a report, owing to the absence of some of the members of the Council, which was granted. The President appointed Drs. Wathen and Maury to serve on the Council in the absence of two regular members.

Papers were then read as follows:

1. "Report of Gynecological Work, with Especial Reference to Methods," by Dr. R. B. Maury, of Memphis, Tennessee.

Discussed by Drs. Wathen, Price, Potter, Johnstone, and closed by the essayist.

2. "Direct Herniotomy," by Dr. W. O. Roberts, of Louisville, Kentucky.

Discussed by Dr. G. Frank Lydston.

3. "The Abortive Treatment of Acute Pelvic Inflammation," by Dr. Virgil O. Hardon, of Atlanta, Georgia.

Discussed by Drs. Price, Engelmann, Ewing, and Hardon.

On motion of Dr. Haggard, seconded by Dr. Brown, no paper was to be read except by title, unless the author was present.

On motion of the Secretary the Association adjourned until 3 P.M.

Afternoon Session.

The Association was called to order at 3 P.M. by President McGuire.

4. "The Improved Cæsarean Section vs. Craniotomy," by Dr. W. D. Haggard, of Nashville, Tenn.

5. "Treatment of Ectopic Pregnancy," by Dr. W. H. Wathen, of Louisville, Ky.

6. "Perineorrhaphy," by Dr. A. W. Johnstone, Danville, Ky.

Discussed by Drs. Hadra, Wathen, Price, Ewing, and Blanks, and then on motion further discussion was postponed until Wednesday morning, second day.

7. "Pus in the Pelvis, and How to Deal with It," by Dr. Joseph Price, of Philadelphia, Pa.

Discussed by Drs. Hardon, Engelmann, Stone, Robinson, Hadra, Potter, and closed by Dr. Price.

Evening Session.

A large audience, considering the very unpleasant weather, attended the exercises in the Broad Street Museum Hall.

The stage was decorated with plants, and music enlivened the occasion.

The platform was occupied by the speakers and officers of the Association and members of the Local Committee of Arrangements. Dr. J. R. Buist presided.

The Address of Welcome was delivered by Hon. A. J. Caldwell, who arose amid much applause, and, after quiet was restored, addressed the Association as follows:

Mr. Chairman, Members of The Southern Surgical and Gynecological Association, Ladies and Gentlemen:

In extending to you the greeting of the people of Nashville I am fortunately emancipated from the necessity of intruding upon

you the commonplaces of an address of welcome. That welcome is already spoken in the faces that surround you; "whose brows, like a title leaf, foretell the nature of the friendly volume," and the brightness of whose eyes "is apter than my tongue to tell my errand." My utterances, of little value in themselves, will claim some value in your estimation by reason of those I represent, for our doctors "have given us medicine to make us love them," and we, therefore, respect and honor their guests.

The object of your meeting here is one that excites profound interest and commands the good wishes of all. By taking counsel together you seek to get nearer to scientific truth, in order particularly to administer to the fairer and better part of the race. Around the beauteous loins of maternity hangs the girdle of the travail, the bitter memento of the primal curse. Long has woman suffered from the most insidious and excruciating of "the ills that flesh is heir to." Held in slavery by disease and confined in its cruel dungeons, stretched upon the rack of pain, scourged with thongs, crowned with thorns and crucified in vicarious suffering to give life to others, the lovely and helpless victim appeals to the prayers of women, the prowess of man and the pity of God.

The gynecologist is the Knight-errant of scientific chivalry, sworn to succor helpless damsels in distress, rescue mothers and free them from the tyranny of disease and the darkness of despair. His mission is, not only to meet and defeat woman's enemies that may attack her in the open field in common with man, but also to seek out and lay seige to those that obdurately hide and entrench themselves in the obscurities and intricacies of her peculiar organism.

The queen and lady fair of this knight's devotion is the mother of all the living. The reward of his success in her service is the applause of her generous sons, and the tears of her gratitude, which glitter upon the breast of her deliverer like the stars of an unearthly nobility.

There was a time when the witches of ignorance, superstition, and charlatanism met the physician and scientist upon a blasted heath with "Hail to you, Glamis and Cawdor!" as if you were intruders upon their weird and moonlit domain. But now and here lovely maidenhood and glorious matronage greet you in the daylight and on the heights with the prophetic "All hail! you that shall be kings hereafter"—kings over pain, conquerers of suffering.

The people of this fair city look upon your assembly with eyes of welcome, and exalt and magnify your high vocation. They are a comely and manly race; cultured, hospitable, and chivalrous; worthy of the goodly land in which they live,—

> "Where the mountains that enfold
> In their wide sweep the autumn landscape round,
> Seem groups of giant kings, in purple and in gold,
> That guard enchanted ground."

They have given many sons to glory. The field, the bench, the bar, the sacred desk, have been made illustrious by their valor, their learning and their eloquence. The annals of your great profession are lit up by their shining names. Jennings and Watson, Buchanan, Winston and Martin, Bowling and Eve, are a few that are upon your roll of honor, and their memories are still dear to the hearts of this people. If ever the spirits of the dead are permitted to revisit the scenes they loved while living, then their forms often look upon this, their city, set like a jewel in her coronet of hills.

I extend to you the salutation of a warm-hearted Southern welcome. Our city wishes your meeting the highest success in the history of your Association, but if this may not be so, she says to you with Virgil,—

> Though you may not *now* the foremost palm attain—
> For ah! as yet that haughty wish is vain—
> Let those enjoy it whom the gods ordain:
> But to be last, the laggard in the race—
> Redeem yourselves and us from that disgrace.

After an interval of music the response to the address of welcome was delivered by Dr. J. M. Mathews, of Louisville, Ky.

Dr. Hunter McGuire then delivered the President's annual address, which was heartily applauded.

SECOND DAY—*Wednesday, November* 13, 1889.

Morning Session.—The Association was called to order at 10 A.M., by Vice-President Dr. Bedford Brown, of Alexandria, Va.

Discussion of Dr. Johnstone's paper resumed. Discussed by Drs. Engelmann, Brownrigg, Stone, Cunningham, Robinson, Hardon, Wathen, Lydston, and discussion closed by the essayist.

8. "Gynecology in its Relation to Obstetrics," by Dr. W. L. Robinson, of Danville, Va.

Discussed by Drs. Brown and Douglas.

9. "Continued Menstruation after Double Ovariotomy," by Dr. George J. Engelmann, of St. Louis, Mo.

Discussed by Drs. Haggard, Johnstone, Hardon, Roberts, Douglas, Brokaw, Wathen, Lydston, and closed by essayist.

10. "An Experimental Study of Intestinal Anastomosis," by Dr. John D. S. Davis, of Birmingham, Ala.

11. "Intestinal Anastomotic Operations with Segmented Rubber Rings, with some Practical Suggestions as to their Use in Other Surgical Procedures," by Dr. A. V. L. Brokaw, of St. Louis, Missouri.

The papers of Drs. Davis and Brokaw were discussed conjointly, by Drs. Roberts, Hardon, Owen, McGuire, Potter, Cunningham, Lydston, Douglas, Engelmann, W. E. B. Davis, and discussion closed by the essayists.

Afternoon Session.

The following communications were read:

DR. HUNTER MCGUIRE, *President of The Southern Surgical and Gynecological Association,*

DEAR SIR: An invitation is hereby extended to your Association to visit the halls and cabinets of Vanderbilt University to witness the facilities of instruction here afforded the young men of our country.

A hearty welcome awaits your distinguished body whenever it can find it convenient to visit us.

Respectfully,

L. C. GARLAND, *Chancellor.*

MASONIC LIBRARY ASSOCIATION,
NASHVILLE, TENN.

The members of the Masonic fraternity in attendance on the meeting of The Southern Surgical and Gynecological Association are cordially invited to visit the Masonic Library during their stay in the city. C. F. FULLER, *President.*

Dr. A. M. Owen, of Evansville, Indiana, moved that the invitations be declined with thanks, inasmuch as the Association had too much work to do. The motion being seconded was carried.

12. "The Open Abdominal Treatment," by Dr. B. E. Hadra, of Galveston, Texas.

The Secretary moved that Dr. McMurtry's paper be read and the two papers discussed conjointly. Carried.

13. "Twenty Consecutive Cases of Abdominal Section," by Dr. L. S. McMurtry, of Danville, Ky.

14. "Complications Occurring in the Clinical History of Ovarian Tumors," by Dr. Richard Douglas, of Nashville, Tenn.

Evening Session.

The three last papers were then discussed at length by Drs. Potter, Roberts, Stone, Wathen, Engelmann, Hardon, Haggard, Lydston, Cunningham, Brownrigg, W. E. B. Davis, and discussion closed by the essayists.

15. "Tropho-Neurosis as a Factor in the Phenomena of Syphilis," by Dr. G. Frank Lydston, of Chicago, Ill.

Discussion postponed till Thursday morning.

On motion the Association adjourned till 10 A.M., Thursday morning.

THIRD DAY—*Thursday, November* 14, 1889.

Morning Session.—The Association met at 10 A.M., and was called to order by the President.

16. "Gunshot Fractures of the Femur," by Dr. John Brownrigg, of Columbus, Miss.

Discussed by Drs. Stone, J. D. S. Davis, Hogan, Lydston, Roberts, and Cunningham.

17. "The Treatment of Cystitis in Women," by Dr. Hunter McGuire, of Richmond, Va.

18. "Treatment of Contracted Bladder by Hot Water Dilatation," by Dr. I. S. Stone, of Lincoln, Va.

The papers of Drs. McGuire and Stone were discussed by Drs. Lydston, J. D. S. Davis, Engelmann, Roberts, Brokaw, Hadra, W. E. B. Davis, and discussion closed by the essayists.

19. "Remarks on Certain Obscure and Minor Forms of Pelvic Cellulitis Simulating Malarial Fever," by Dr. Bedford Brown, of Alexandria, Va.

Discussed by Drs. Lydston, Robinson, W. E. B. Davis, and Engelmann, and closed by essayist.

The following papers were then read by title:

"Concerning the Causes of Frequent Failure of Relief of Reflex Symptoms After Trachelorrhaphy," by W. F. Hyer, M.D., Meridian, Miss. "Laparotomy in Extra-uterine Pregnancy," by Waldo Briggs, M.D., St. Louis, Mo. "Puerperal Convulsions," by John Herbert Claiborne, M.D., Petersburg, Va. "Laparotomy in Intestinal Obstruction," by C. Kollock, M.D., Cheraw, S. C. "Observations Based Upon an Experience of Seventy-five Abdominal Operations," by Joseph Taber Johnson, M.D., Washington, D. C. "Injury of the Musculo-spiral Nerve in Fractures of the Humerus," by William Perrin Nicolson, M.D., Atlanta, Ga. "Conservative Surgery in Injuries of the Foot," by J. T. Wilson, M.D., Sherman, Texas. "The Treatment of Urethral Stricture," by F. W. McRae, M.D., Atlanta, Ga. "Epithelioma of the Penis, with the Report of a Case," by D. W. Yandell, M.D., Louisville, Ky. "A Unique Case of Constipation," by J. M. Mathews, M.D., Louisville, Ky. "Treatment of Malignant Diseases of the Rectum," by W. T. Briggs, M.D., Nashville, Tenn. "What Civilization is Doing for the Human Female," by A. Lapthorn Smith, M.D., Montreal, Canada. "The Surgical Treatment of Empyema, with Cases," by J. A. Goggans, M.D., Alexander City, Ala. "What Kind of Instruments does Modern Antiseptic Surgery Demand?" by J. W. Long, M.D., Randleman, N. C.

The Judicial Council made the following report:

Resolved, That the proposed change in Article V., Section 1, of Constitution would not conduce to the best interests of the Association; we, therefore, recommend that the proposed change be not made. Respectfully submitted,

JOHN S. CAIN, M.D.,
Chairman.

Dr. Richard Douglas reported that the Auditing Committee had examined all the accounts and vouchers of the Treasurer and found them correct, with a balance on hand of $559.80.

The Judicial Council made its report on the names presented for membership, and the following were recommended by the Council and elected members by the Association:

Brokaw, A. V. L.	St. Louis, Mo.
Caldwell, W. H.	Lexington, Ky.
Engelmann, George J.	St. Louis, Mo.
Ewing, W. G.	Nashville, Tenn.
Johnson, Joseph Taber	Washington, D. C.
Le Grande, J. C.	Anniston, Ala.
Lydston, G. Frank	Chicago, Ill.
Mathews, J. M.	Louisville, Ky.
Nichol, W. L.	Nashville, Tenn.
Nicolson, W. Perrin	Atlanta, Ga.
Owen, A. M.	Evansville, Ind.
Pendleton, John E.	Hartford, Ky.
Polk, W. M.	New York City.
Potter, W. W.	Buffalo, N. Y.
Price, Joseph	Philadelphia, Pa.
Robinson, W. L.	Danville, Va.
Stephens, James B.	Nashville, Tenn.
Tuholske, H.	St. Louis, Mo.
Yandell, W. D.	Louisville, Ky.

The local members of the Association, through Dr. Haggard, extended an invitation to all visiting members to a dinner to be given at the Maxwell House in the Ladies' Ordinary, which was accepted with thanks.

Dr. I. S. Stone offered the following:

Resolved, That the thanks of the Southern Surgical and Gynecological Association be returned to the physicians and citizens of Nashville for the hearty welcome accorded the visiting members of the profession, and for the generous hospitality shown them.

Dr. Brown's paper was now discussed by Drs. Cunningham, Lydston, Robinson, Haggard, and Engelmann, and discusssion closed by the essayist.

The election of officers was then proceeded with, the result being as follows:

President.—Dr. George J. Engelmann, of St. Louis, Mo.

Vice-Presidents.—Drs. B. E. Hadra, of Galveston, Texas; and Duncan Eve, of Nashville, Tenn.

Judicial Council—to fill vacancies on—Dr. Hunter McGuire,

Richmond, Va., for one year; Dr. Bedford Brown, Alexandria, Va., for five years.

Drs. Rogers and Hardon were reappointed on the Publication Committee.

Atlanta was selected as the next place of meeting, and Dr. Virgil O. Hardon was appointed Chairman of the Committee of Arrangements.

Dr. Hunter McGuire in vacating the chair as President, addressed his successor (Dr. Engelmann) as follows:

Dr. Engelmann, It is only a short time ago that this Association was born. It came into the world a lusty infant. Its cry was heard all over the South. Under the splendid management of Dr. Haggard it continued to grow, to increase in strength and influence. I have tried my best to keep it where he left it. Try your best to keep it as I turn it over to you. (Applause.)

Dr. Engelmann addressed the Association in the following language:

GENTLEMEN: It is needless to say that I have heard the cry of that infant. I have watched it from its beginning. I have been so much interested in the work of this Association that I was anxious to be with you at this meeting; and the reception you have accorded me is one of those things which well repays the physician. Such a recognition as I have received at your hands is more gratifying than any reward, and it most thoroughly and amply repays one for the oft-repeated disagreeable trials of professional life. Gentlemen, this Association is watched throughout the South with great interest, and it will soon be watched throughout the entire country, because it has grown rapidly and strongly under such able management as that of the two Presidents who have preceded me. It is hard to follow in the footsteps of such men as Drs. Haggard and McGuire; I must, therefore, ask your kind indulgence and assistance. We must all work together, and, as far as I am personally concerned, I shall certainly do the best I can to serve its interests. (Applause.)

A vote of thanks was tendered the President and Secretary for their efficient services.

The Association then adjourned to meet in Atlanta, Georgia, second Tuesday in November, 1890.

W. E. B. DAVIS, M.D.,
Secretary.

ANNUAL ADDRESS OF THE PRESIDENT.

By Hunter McGuire, M.D., LL.D.,
Richmond, Va.

Fellows of the Southern Surgical and Gynecological Association, Ladies and Gentlemen: It is with unassumed diffidence that I appear before you to-night as the presiding officer of this body, and I approach with great hesitation the task of delivering the annual address, in compliance with the established usage of all assemblies of this kind in America.

I feel confident that there are many present who would fill the office with more ability, and that it would have been better for our Society if another had been chosen in my stead. I desire in the commencement of my remarks to return my thanks to my fellow-members for the honor they have conferred upon me by calling me to preside over the deliberations of this, our Southern Association.

It has been suggested that there was no need for the existence of this Society; that the State, National, and International Medical Associations were sufficient for all that was required for the progress and development of medical science. This was a mistake, as I hope I may be able to show. There is need, throughout the whole South, for county and State associations, and a special need for the existence and perpetuation of this organization.

It goes without saying that union and coöperation have become as indispensable to scientific bodies as in the material walks of life. In all human enterprises, every advance accomplished is by coöperative work. In this way, laws are

perfected, agriculture improved, philosophical investigations consummated, political and philanthropic reforms attained; by it railroads and canals are built, just and equitable laws enacted, civilization extended, tyranny and oppression overthrown, the Gospel preached, and civil and religious liberty secured. By union and coöperation alone can the science of medicine be advanced. Isolated, individual men who, in the pride of self-reliance and self-sufficiency, reject the aid and sympathy of their contemporaries, are failures. They may have great ability, they may be faithful and enthusiastic workers in the departments to which they have devoted themselves, but in the end they are disappointed, because they have overestimated their individual strength and have not sought the companionship and concurrence of others. No class of men appreciate the value of coöperation more than the medical men throughout the world. Germany, Austria, France, and England have for years shown how coöperation can bring about medical progress through the deliberations of the respective assemblies that are annually held in these countries. The people of this country, also, in their State and general societies have added much to the development of medical learning. So highly is coöperative work appreciated by the medical world, that the necessity for an International Congress a few years since became imperative. I need not tell this audience what it has already accomplished. At its last meeting, held in Washington, the nature and extent of its labors can only be understood by the examination of the five volumes that contain the contributions of its members; the work is a medical library in itself. America—ever alert, energetic, and industrious, always anxious to obtain and practically apply that which is best—has been no laggard in her endeavors to promote the advancement of medical science. Through the American Medical Association, how much has been accomplished! In its grand meetings are brought together some of the ablest men of the land. Historic figures, many of them have become, and the fruit of their labors will hand them down through ages as among the foremost of their

day and generation. Her sister society, the American Surgical Association, although younger, has just cause to be proud of her work. Her field is necessarily restricted to one of the great divisions of medicine—a division of the highest importance. That the field has been well worked, that the harvest has been rich and abundant, and that it has been gathered into our storehouses, I take it for granted none will deny. So I might refer to other associations, and to the Congress of these associations, did time permit.

It may be said with truth that, until of late, the South has not kept pace with the North in medical progress and development. This has arisen from a variety of causes. Prior to the late war, slavery was antagonistic to the development of dense populations; fertile areas were monopolized by the large planter, and he generally occupied more space than his agricultural needs required. He believed in what he called "plenty of elbow room." He was opposed to outside intruders, and desired neither the development of towns nor the growth of cities in his vicinity. Criticise this policy as you may, condemn it if you will, I am not engaged in defending it, but am merely stating patent facts, in order to account for the manner in which it retarded the development of medicine. While this was true, yet this state of society produced splendid men and women, probably the grandest on this continent. Culture, grace, elegance, self-reliance, were its legitimate offshoots. Orators, poets, statesmen, soldiers, scientists, lawyers, ministers, and physicians—the first and greatest in the whole land came out of it. What orator have we like Henry or Yancy, what poet like Poe, what scientist like Matthew F. Maury, what statesman like Jefferson, what jurist like Benjamin, what divine like Hoge, what soldier like Stonewall Jackson, what surgeon like Sims? And the women—how can I describe them! They were as cultured as they were refined, they were as beautiful as they were queenly; the loveliest of sweethearts, the noblest of matrons.

Let us look for a moment and see from whence these people of the South came, and what they have done.

The colonial settlers of the southern portion of North America were kindred by ties of blood, by association, and by the laws of common inheritance. They came to this country deeply imbued with the idea of civil liberty. In many instances they were descended from a superior element of the English people. The blood of the cavalier coursed through their veins. They were prepared to organize a government, to undertake the herculean task of creating a country out of chaos. And they accomplished it.

To these settlers were soon afterward added another stream of immigrants, who came into the South through Maryland and Virginia and through the seaports of the Carolinas and Georgia. These were the God-loving, tyranny-hating Scotch-Irish, who have left their distinguishing characteristics to this day upon the people of every State in the South, from Maryland to the Rio Grande.

When the struggle came for the defence of their rights against the mother country, how quickly her sons took up arms in defence of the common cause, and how nobly they performed their part it is useless to say, for is not the history of the time filled with accounts of their patriotism and achievements? At the council board, on the platform, and in the field, they stood preëminent. The enunciation of principle, the declaration of rights, sprung from the fertile brain of a Southerner, and to-day the readers of American history recognize in Jefferson the foremost thinker of his age. Well has a New Englander, in speaking of Washington and the Southern soldiers of 1776, recently said: "We must go back to Athens to find another instance of a society so small in numbers and yet capable of such an outburst of ability and force." Without the men of the South, the Revolution of 1776 would have gone down into history as the Rebellion of that period.

How wonderful it is, that in the comparative seclusion and solitude of an agricultural country, the men should have been reared whose writings on constitutional government embodied the wisdom and the experience of the patriots of all ages, and

whose State papers actually formed the mould in which the Constitution of the United Colonies was shaped; and that then, after Southern statesmen had formed the most perfect government the world ever saw, that Southern soldiers should have made it *an accomplished fact* by their skill, valor, and endurance.

Edmund Burke, in his speech before the British Parliament, March 22, 1775, on the conciliation of the American colonies, spoke thus of our people:

"There is, however, a circumstance attending these colonies which, in my opinion, ... makes the spirit of liberty still more high and haughty than in those of the northward. It is that in Virginia and the Carolinas they have a vast multitude of slaves. . . . . And these people of the South are much more strongly and with a higher and more stubborn spirit attached to liberty than those to the northward. Such were all the ancient commonwealths, such were our Gothic ancestors, and such, in our day, the Poles; and such will be all *masters* who are not slaves themselves. In such a people the haughtiness of domination combines with the spirit of freedom, fortifies it and renders it invincible."

Men of Southern birth and Southern rearing were the successful generals in the war of 1812, and the central figures in 1846. The acquisition of territory was made during the administration of Southern men; Louisiana, Florida, Texas, and California were acquired during their terms of office. Upon the Supreme Court bench of the United States they are to be conspicuously found. The Chief Justiceship was held continuously for sixty-three years by Southern men. I need not speak of the orators and statesmen produced by every State in the South; they are household names.

History but repeats itself; like occasions produce like results. The patriot of to-day is but the reflex of the patriot of the past. In our late civil contest—if it be proper to call it so, for was it not rather two sovereignties waging war, the one against the other?—the men of the South once more dis-

played the same great qualities that had characterized their ancestors in the American Revolution.

Modern Europe stood aghast at the daring of a people they had been taught to regard as effeminate. They had expected that an ephemeral struggle would be made, near akin to those which had frequently taken place among the mixed Spanish populations to the south of us. Climate, temperature, the pernicious effects of slavery, were all believed to have had their influence, and to have produced a weak and vacillating people. Had luxury enervated them, had they become effeminate, had the increase of wealth and the impress of slavery rendered them physically and intellectually inferior to the men of the North? If any so believe, let the deeds of arms that have passed into history speak. Examine the details of the well-contested battlefields, and see if such a declaration is true. Jackson, Lee, Johnson, Claiborne, Stuart, and Forest! What tender thoughts, what hallowed associations, gather around the names of these bright stars in the Southern constellation! Does all history, does even the field of romance, furnish heroes superior or patriots more noble? They were the leaders of an equally brave and noble people, who, when all save honor was lost, submitted to the inevitable with a dignity born only of true greatness.

And now of the Confederate surgeon let me say a word. How can I express in adequate terms my admiration for him! He possessed virtues peculiarly his own. Coming from civil life, it was wonderful to see how rapidly he adapted himself to the discipline of the army, and conformed to the requirements of military life. The hardships he endured and the privations to which he was subjected soon transformed him from a novice to a veteran; and I can say with truth that, before the war ended, some of the best military surgeons in the world could be found in the Confederate army. His scanty supply of medicines and hospital stores made him fertile in expedients of every kind. I have seen him search field and forest for plants and flowers whose medicinal virtues he understood and could use. The pliant bark of a tree made

for him a good tourniquet; the juice of the green persimmon, a styptic; a knitting-needle, with its point sharply bent, a tenaculum; and a penknife, in his hand, a scalpel and bistoury. I have seen him break off one prong of a common table fork, bend the point of the other prong, and with it elevate the bone in depressed fracture of the skull, and save life. Long before he knew the use of the porcelain-tipped probe for finding bullets, I have seen him use a piece of soft pine wood, and bring it out of the wound marked by the leaden ball. Years before we were formally told of Nélaton's method of inverting the body in chloroform narcosis, I have seen it practised by the Confederate surgeon. Many a time I have seen the foot of the operating table raised to let the blood go, by gravitation, to the patient's head, when death from chloroform was imminent; and I will add that in the corps to which I was attached, chloroform was given over 28,000 times, and no death was ever ascribed to its use. Many of the medical officers of this corps were wounded or killed on the field. One, I saw fall at Strasburg, amid the cheers of soldiers at the evidence he gave of devotion to duty; another at Sharpsburg, facing an assault before which even veterans quailed and fled; and a third I found upon the bloody field of Cold Harbor, dying with a shell-wound through his side. As I knelt down beside him and told him his wound was mortal, he answered, "I am no more afraid to die than I was afraid to do my duty." They were splendid specimens of a noble race—a race whose achievements astonished the world and wrung from the foe himself a full measure of praise. During the terrible six days which followed the retreat of our army from Richmond, the medical men, by their unswerving devotion to duty and cheerful support, contributed no little to inspire the heroism which turned our defeat into honor, and made Appomattox one of the proudest memories of the war.

The social condition of the South, while it offered unusual and rare advantages to her sons generally, denied to the medical men, save in exceptional instances, the opportunities

which were conducive to the progress and development of medicine. This peculiar society gave to them, however, boldness of thought, independence in investigation, and they possessed the courage of their convictions. They thought well and they thought clearly; they fought their way into position at every leading medical centre in the country. Many of them started life in small towns or rural districts, and, after testing their strength and gaining the confidence born of experience, they generally moved to the larger cities, North and South. Is it more than necessary to mention Frick, Goodman, and Smith, of Maryland; Hartshorne, Clapman, Horner, Mitchell, Mütter, and J. L. Cabell, of Virginia; Jones, Charles Caldwell, and Dickson, of North Carolina; Geddings, Bellinger, Toland, and Sam H. Dickson, of South Carolina; Miegs, Arnold, Bedford, and Anthony, of Georgia; Eve, of Tennessee; Nott and Baldwin, of Alabama; Stone and Jones, of Louisiana; Dudley, McDowell, and Yandell, of Kentucky; to recall to your minds the great instructors in medicine in this country? How well they performed their part is prominently shown in the lasting impressions they have left behind them. Historic they are, and historic they will continue to be; untold generations will arise to bless them, and they will not fade into obscurity through the lapse of time.

How can I speak, except in terms of reverence and praise, of the practitioner who remained with his country *clientèle*, and yet established a national reputation. Struggling under disadvantages which can only be appreciated by those similarly situated—with paucity of material and the absence of professional association, with the requisite elements of success arrayed against him—he must be a man of genius who advances an idea, demonstrates a fact, constructs a principle, or invents an operation of sufficient importance to arrest the attention of the medical world; truly he must be a man of profound genius. Of such men were Crawford Long, of Georgia; Mettauer, of Virginia; McDowell, of Kentucky; Sims, of Alabama—Sims, the greatest and grandest of all the

men who have recently passed away. Satisfying the requirements of a continent, he traversed the ocean in order to give to Europe the benefit of his learning and experience. He claimed among his patients one or more members of the crowned heads of Europe. The relief that he afforded suffering humanity from diseases that before his day were classed as incurable, can only be estimated by those who have examined the subject in detail. He was the pioneer of gynecological and abdominal surgery. The fundamental truths established by him will be remembered, their utility recognized, and their principles applied, so long as surgery is a science. He passed away in the full zenith of his glory—beloved, respected, and renowned. The bronze statue that is to be erected by his professional friends over his mortal remains will bear but feeble attestation to the reverence in which he is regarded by the civilized world.

Would that good taste and the proprieties of this occasion permitted me to mention the names of men in the profession, living now in the South, who have achieved for themselves great renown. Some of these gentlemen I see before me to-night, and I congratulate them upon the fame fairly won by their genius. To the medical students, here in such numbers this evening, these distinguished men will say, as they of all others know, that genius is only hard work well directed. Some future speaker, filling the place I occupy now, in fitter and more eloquent words will tell another audience the names of these men, and they will go down into history as great and grand as those that I have just mentioned.

Organization must be our watchword. In a country where all is progress, where material resources are being rapidly developed, the medical men of this section must not prove laggards.

Agriculture is in a state of progressive advancement. Our mineral wealth is at last appreciated and turned to valuable account; the hum of the loom, the ring of the anvil, and the sound of the forge, resound throughout the land. Our waste places are no longer desolate. The increased growth of agri-

cultural products is amazing. The cotton crop of 1888 is more than double the crop of 1860, the time at which it was believed the South had reached her heyday of prosperity.

Last year (1888) the value of the crops in the South was the largest on record, and yet this year (1889) the value of her agricultural products alone, it is estimated, will be increased $125,000,000. Statistics show her rapid growth in other industries to be fully as great, if not greater. And this is the legitimate outcome of the courage, sagacity, and industry of her own people—of a people born and reared under the Southern sun. For there is no New South—the blood of her patriots of the past flows in the veins of her people to-day, unmixed by any other strain. Blessed with an unequalled climate; with fertile lands, whose products are most varied and abundant; with coal, minerals, and precious stones, in quantities exceeding the wildest imaginations; inhabited by a people who have shown to the world their patriotism, endurance, and valor; with the surplus negro population relegated to Mexico, toward which country, in the providence of God, it is now drifting—the South is advancing and improving in every way.

Villages are springing up in every direction, towns and cities are being located at all important commercial points, and those already established are marked by annual increase both in wealth and population. All these things tend to the advancement of the object we have in view. Already there is scarcely a community that is not sufficiently dense to furnish clinical material to those engaged in active practice. How much there is to be learned about diseases peculiar to this South-land of ours—the manner in which malaria affects the population; where the miasma is generated; the way it modifies and alters other diseases and surgical conditions existing in the same sections; how acute attacks show themselves; in what way chronic malaria exhibits itself, and the pathological changes it brings about—all these should be studied. The effect of prolonged heat in summer and damp cold in winter are conditions worthy of your attention. The

drainage of our wet, alluvial regions, and the general improvement of our hygienic conditions, are grave problems to solve.

We cannot afford to become mere borrowers; we must be contributors to this, our beloved science. Remember, the thought of to-day may be the dogma of to-morrow. He who elucidates an idea, establishes a fact, or creates a system, is a universal benefactor of mankind. How this should stimulate the good men to become workers in this direction.

Modern inventions have annihilated space as to time, and by so doing have brought into a common fold the scientific men of every country and clime. The thought of to-day, to-morrow is the property of mankind.

For all these reasons, gentlemen of the Association, it becomes a matter of paramount importance that you should stimulate your brethren to organize societies in every section of the South. Never leave off trying until county societies are established and actively at work in every county in each Southern State. Foster and encourage the State and district societies; establish close relations with them, and, when desirable, induce their members to become your members. If the plan proposed is even partially carried out, before many years this Society will become one of the most important in this country.

One thing more is needful for the elevation of the moral, as well as the scientific, status of our profession, and that is harmony and good-will for our fellow-workers. Nothing contributes to this so much as these annual reunions; by these meetings rivalries cease, distrusts are dispelled, and kindly relations established; old friendships are confirmed, new friends made, and greater tolerance and charity prevail. We are made to see that, in the sometimes meagre and uncertain scientific facts in our calling, there is reason for honest difference of opinion. To these meetings every patient and conscientious worker can bring his contribution and add it to the common stock of ascertained knowledge. Let us cultivate a broad and generous appreciation of each other's work; let us eliminate every particle of envy at the success of others;

let us heartily commend all who have enlarged the boundaries of our science or who have improved its art. Let us remember that the man who can appreciate what is excellent in others, is the man most likely to accomplish what is excellent himself.

Gentlemen of the Southern Association, let our motto be lofty aim and united action. As Southern men, let us show to the world that, under changed conditions, we have still the stamina of our forefathers. As members of our beloved profession, let us strive to be first in scientific attainment, first in integrity, first in high purpose for the good of mankind.

REPORT OF GYNECOLOGICAL WORK, WITH ESPECIAL REFERENCE TO METHODS.

By R. B. Maury, M.D.,
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The paper which is here offered presents a brief summary of the more important portion of my operative work during the past year.

In connection with this report some comments are made upon the methods employed, because it is evident that further progress and increased success must depend largely upon the perfection attained in our methods of operating.

With four exceptions all of the operations have been done in a private hospital, built especially for the purpose, and under my own control.

The summary embraces:

21 laparotomies for the removal of ovarian tumors, or of the uterine appendages, or for the relief of obscure disease within the abdomen.

2 laparotomies for ectopic gestation.

28 operations for laceration of the cervix.

14 perineal and vaginal prolapse operations.

5 rectoplasties.

4 anterior colporrhaphies.

The accompanying table presents a synoptical report of the abdominal operations.

Upon many of these cases no comment is necessary; with reference to the others I may properly make some remarks.

It will be observed that out of the twenty-one operations

there were two deaths. One of these might be termed accidental; the other was certainly unavoidable.

The one referred to as an accidental death (No 15) was a case of chronic ovaritis with hyperplasia, and also with extensive cystic degeneration. According to her physician, fearful hemorrhages had repeatedly left her pulseless for many hours. The removal was easy. After the abdominal sutures were introduced some bleeding was discovered, which did not cease upon sponge-packing of the pelvis, or afterward from irrigation with hot water. After examination of the pedicle ligatures, and finding that they were properly tied, a glass drainage-tube was inserted, and the wound closed. A nurse emptied the tube by suction at short intervals.

The patient appearing to be in good condition, I left her for urgent reasons, and on returning in forty-five minutes, I found her pulseless and unconscious.

The wound was at once reopened, the cavity washed out with hot water, and search again made for the bleeding point, but without success. The drainage-tube was replaced, and the wound again closed.

As the hemorrhage continued, one drachm of liquor ferri persulphatis was injected through the tube. This at once stopped the bleeding. Reaction with a temperature of 105° F. ensued, and she died on the fourth day from peritonitis. No autopsy was obtained.

I can only speculate in regard to the cause of the hemorrhage; perhaps it was from a torn vein, for the veins in the removed portion of the broad ligament were much dilated.

This case opens the question of the best mode of controlling hemorrhage in a deep cavity like the pelvis, where we cannot see the bleeding point.

I relied on the hemostatic powers of the drainage-tube, but was disappointed. The iron stopped the hemorrhage, but formed a firm plug around the tube, which fixed it firmly in the pelvis. It was removed after forty-eight hours with great difficulty. In a similar case I would be disposed to pack the pelvis around the drainage-tube with iodoform gauze. I have

seen Professor Leopold, of Dresden, use gauze alone as a hemostatic, bringing one end out of the lower end of the incision. He removes it in forty-eight hours.

This case, together with Nos. 11 and 14, formed the subject of my paper on the "Clinical History of Cystic Degeneration." [1]

The characteristic features of this form of disease, as illustrated by these cases, are profuse and constant leucorrhœa, persistent intractable metrorrhagia, and ovarian pain. The ovaries were almost complete cysts; the stroma was nearly destroyed; and, though menstruation persisted with great regularity, the microscopist could find no evidences of ovulation in the diseased organs.

As there was no tubal disease, and presumably from the subsequent history of Cases 11 and 14, no disease of the endometrium, the conclusion was unavoidable that the severe hemorrhages were the result of cystic degeneration.

The case referred to as one of unavoidable death was No. 19. This was a multilocular, thin-walled ovarian cyst, with colloid contents, and universal adhesions, in an anæmic woman, who was sent to me in desperate circumstances, after all attempts to rally her had failed. She was exhausted by a fever of two months' continuance; by daily vomiting and inability to take food; and, lastly, by an attack of bronchitis, which resulted from exposure at night while waiting four hours for a delayed train.

The operation was done after the bronchitis was relieved. The cysts which formed the tumor were numerous and small; the walls were fragile, and tore when caught by the forceps; the contents would not flow through the large trocar, and a portion escaped into the abdomen. The adhesions were universal and strong. On the posterior surface of the tumor the small intestine was extensively attached, and upon eight inches of its length it was necessary to leave the outer layer of the cyst wall. The pedicle was tied early in the operation,

[1] Transactions of the American Gynecological Society, 1889.

and subsequently the upper portion of the cyst was removed. This was necessary to get at the intestinal adhesions.

After an hour's work I had the satisfaction of closing a dry and clean peritoneum—but the shock was too great for so feeble a patient. She never fully reacted, and died the next day.

In Case 3 the operation was done for relief of acute symptoms which supervened in the course of chronic intestinal obstruction. For six days neither flatus nor feces had passed. There were pain and constant vomiting. A small nodulated tumor was felt behind the uterus. This was supposed to be a cancerous ovary.

On making the section, it was found that the uterus, ovaries, and tubes were healthy. The tumor was a cancerous growth involving a coil of small intestine and fixing it firmly in Douglas's pouch. Cancerous nodules were found in its mesentery, upon the adjacent omentum, and on the neighboring intestinal coils.

After untwisting the coils and separating a few adhesions, the wound was closed with the expectation that the patient would die in a day or two. But during the night the vomiting ceased, and the next day she began to take food. On the third day there was a natural fecal evacuation, which was repeated at intervals of three or four days.

She went home on the fifteenth day, and lived one month.

Nos. 16 and 18 may be classed among the most difficult of pelvic operations. In the former, after an hour's work the right ovary was dug out of its bed of old adhesions. The vermiform appendix was firmly fixed close to it, but the Fallopian tube could not be made out. On the left side, neither tube nor ovary could be discovered, the tissues being fused together and contracted by inflammation.

In the latter case there had been a history of disease for fourteen years, following parturition. For eight or nine years she had been a great sufferer from pain in the left hip, associated with an exudation fixing the womb in a position of retro-version.

In September she came under my care with a tumor in the left hypogastric region. The pelvic exudation, felt through the vagina, was of stony hardness: a firm ring was formed around the rectum which prevented the passage of the index finger, and seriously obstructed defecation.

On making the section, the abdominal wall was found nearly three inches thick, and on the left side very unyielding and resistant from inflammatory thickening of the peritoneum. The omentum was adherent to the pelvic brim, and strong adhesions were broken before the tumor was reached.

After a determined effort of three-quarters of an hour, the tumor was, to a great extent, separated from its posterior attachments, but a cartilaginous button remained, connecting it with the rectum. I could do nothing toward separating the anterior attachments of the tumor. If this had been possible, I would have separated the rectal attachment with scissors, and controlled hemorrhage by the pedicle ligature.

Under these circumstances the sac was aspirated, and nearly two ounces of pus removed. The opening was then enlarged, and the sac and pelvis thoroughly irrigated by means of the siphon-trocar. Two drainage-tubes were then inserted, one into the pus sac, the other into the pelvis. The pus sac could not be attached to the abdominal incision. Both drainage-tube openings were closed by the end of the second week.

This method of drainage I had made use of in a previous case under similar circumstances with satisfactory results.

Much uncertainty, however, surrounds the future of both these cases, as it does that of all incomplete operations.

The methods which I have followed with scrupulous care are those which have been developed by the labors of Sir Spencer Wells and his able successors in the Samaritan Hospital, and by Dr. Keith, who worked contemporaneously with him; and, lastly, by Mr. Lawson Tait, who may be said to have well-nigh solved all the problems involved in the successful treatment of inflammatory disease of the uterine appendages, and in the management of ectopic gestation.

These methods may be summarized as follows:

1. An aseptic field of operation, and an aseptic surgeon.

2. A small incision—in the case of inflammatory disease in the pelvis, just large enough to introduce, and work with, two fingers.

3. Aseptic silk ligatures, as fine as is consistent with safety in tying.

4. Enucleation of diseased structures, in spite of firm adhesions or even profuse hemorrhage.

5. Irrigation by means of the siphon-trocar as a substitute in most cases for sponging; using simple hot water for this purpose, and excluding all antiseptics.

6. Drainage often, and whenever one is in doubt as to its necessity.

7. Careful replacement, by spreading out, of the omentum, before proceeding to close the wound.

8. Inclusion of all the structures in passing the abdominal wall sutures; and placing the deep sutures one-half an inch apart.

9. The use of means for moving the bowels on the second or third day, after removing the appendages; and the avoidance, if possible, of opium.

Out of forty-three patients surviving abdominal operations from a few months to several years, I know of but one who has a hernia. This was the result of leaving off her bandage during an attack of dysentery, which occurred two months after a section one inch and a half in length, for an intra-peritoneal hæmatocele.

My cases have all been in private practice. I have heard from most of them repeatedly after operation, and I think if hernia had occurred I would know it.

I have had one tube-sinus which still continues to discharge at times, although one of the pedicle-ligatures was cast out sixteen months after the operation.

I will now consider the cases of ectopic gestation.

The first case was under the care of Dr. W. W. Taylor,

who, suspecting ectopic gestation, requested me to see her with him on Feb. 17th. Her history is as follows:

Case I.—Jewess, aged thirty years, of stout build, who had one child seven years ago. No conception since.

Her health was good and menstruation normal to Dec. 20, 1888, when the menstrual period continued five days.

Six weeks later a slight bloody discharge appeared, accompanied by pain in the hypogastrium and right iliac region. The pain was not continuous: the bloody discharge was a mere stain.

She suffered from nausea, and thought she was pregnant.

An examination showed the uterus to be somewhat enlarged, but in its normal position. Its mobility was impaired and there was decided peri-uterine tenderness, but no pelvic tumor could be found. The pulse was 100; temperature 99½°. The patient did not appear to be very ill, and the symptoms, I thought, rather pointed to a normal pregnancy, with slight pelvic peritonitis.

Until the end of the first week in March there was little change; the symptoms were rather better.

There was a continuous bloody discharge, but the pain was less, and at longer intervals.

No membrane or shreds had been, or were subsequently passed.

On March 8th she was suddenly seized, while at stool, with severe pain. Dr. Taylor found her pale, with cool extremities, and feeble pulse.

A hypodermic injection of morphine and other means readily brought about reaction.

On the following day we again examined her, and found the uterus fixed, but pushed to the left side by a tumor which occupied Douglas's pouch and the right side of the pelvis. The diagnosis was now reasonably clear.

I pause in the recital of this history to remark that, at this time, an abdominal section should have been made; but how prone are we to lay to our souls the flattering unction which Schröder thus expressed: "With care, fatal issue is as a rule avoided: the subjects recover with unexpected quickness: the numerous lymphatics of the pelvis quickly absorb the blood."

Dr. Taylor's report says: "Symptoms of mild peritonitis

continued; her condition improved; no opium was required, and she was free from pain for a week. Her appetite was better, and all the symptoms favorable. The tumor did not increase in size."

On March 27th she was seized with severe pain: the pulse jumped from 104 to 130, and there was increased peritonitis.

The situation had already been fully explained to the husband; preparations had been fully made for an abdominal section, and this was at once urged. Notwithstanding his foreknowledge, her husband did not give his consent to the operation until March 30th.

The patient's condition was then very unfavorable; the abdomen was swollen, the skin had assumed a deep icteroid hue, and the pulse was very feeble. The abdomen was opened with the assistance of Drs. Taylor and R. W. Mitchell.

A large amount of clots and dark, bloody serum was found, with a ruptured Fallopian pregnancy of about the tenth week, the fœtus being discovered alongside the right tube.

After removal of all these and ligation of the tube, the abdomen was irrigated with hot water and a drainage-tube inserted.

Though she bore the operation well, and was put to bed with a pulse of 104, the patient did not improve.

There was much discharge of dark fluid from the tube; the color of the skin deepened; the pulse increased in frequency; she became delirious, and died on the third day.

Case II.—Mrs. K., aged thirty years. Had one child eight years ago. No conception since.

Her health was good and menstruation regular up to the 15th of May, 1889. About the middle of June there was a slight "show." Soon after this she began to have nausea, and concluded that she was pregnant.

On the night of July 19th there was a discharge of blood lasting for several hours, and unattended with pain.

On August 12th, and several times afterward, there was a slight bloody discharge.

About the last of July symptoms of peritonitis appeared; the abdomen swelled, was tympanitic and very tender on pressure. Pain was also complained of, oftentimes severe enough to require morphine. There was a slight rise of temperature and pulse.

The vomiting which began after the 15th of June continued. On the 15th of September, when first seen, she was emaciated and feeble from inability to take food and from long suffering. She was confined to bed, and required an opiate nearly every day. The pulse was 90; temperature 99°. The entire abdomen was swollen, very tender to the touch, and tympanitic except over the lower portion, where an ovoid tumor was observed rising from the pelvis as high as the navel, and lying chiefly to the right of the median line. The tumor was dull on percussion, and no fluctuation was perceptible.

A vaginal examination showed that the uterus was pushed to the left side, its fundus lying forward, and the cervix directed toward the left sacro-iliac symphysis. It was fixed in this position by a tumor which occupied the middle and right side of the pelvis, which was evidently a part of the uterus and also of the abdominal swelling. The uterine sound entered three and one-fourth inches. Its withdrawal was followed by a bloody discharge. The cervix was swollen, soft and patulous, and all the tissues were unusually succulent. The purple hue of the vagina so often present in pregnancy was absent, and no mammary signs of pregnancy were detected. I at once made the diagnosis of a four months' tubal pregnancy, with rupture between the layers of the broad ligament.

It was evident to me, and to Dr. Edward Mitchell, who saw her with me, that the patient could not live to the end of the nine months. Her only chance was in immediate operation, and the gravity of the case was at once explained to her husband.

With a view of diminishing the vascularity of the sac, and thereby lessening the dangers of laparotomy, I proposed to destroy the fœtus by electricity, and remove it after a week or two. A Gaiffe battery was used the next day, and again on the day after. Strong uterine pains followed this treatment, and a complete decidual mass as thick as the index finger was expelled. The battery was not used again, and as it was evident that the patient was losing ground, laparotomy was done on September 20th.

On opening the abdomen a dark tumor appeared, with uneven surface. It filled the pelvis, and rose to the umbilicus.

Very nearly in the line of the incision was an ovoidal promi-

nence which did not fluctuate. Believing it to be the fœtal sac, I passed a very small trocar in to remove the fluid, but nothing escaped through the canula. After moving the canula in several directions, a bloody stream issued from it. On withdrawing the canula the delicate sac ruptured to the extent of allowing the extrusion of a four months' male fœtus.

There was quite a free flow of blood from the sac, but it was promptly stopped by packing with iodoform gauze.

The edges of the sac were then stitched to the abdominal incision. I was desirous of avoiding drainage in this case, and of leaving the placenta, as Mr. Tait has recommended, by filling the sac with water and afterward closing it so as to exclude the air; but the accidental injury to its wall causing bleeding, made it necessary to drain, and the gauze was relied on for this purpose.

After this operation the abdomen, much distended, was not appreciably diminished in size, and the upper sutures were tied with considerable tension.

The patient's condition was not improved: she was much exhausted, and was restless. The next day her pulse was 96, and temperature 99°. There was much watery discharge from the sac. Hiccup became a troublesome symptom. On the third day the stomach was quiet, and temperature normal, but the pulse had risen to 115. On the evening of the fourth day she died, apparently from exhaustion.

Autopsy: The edges of the sac were firmly adherent to the abdominal wall. The placenta was attached to the left wall of the sac. The large tumor rising to the umbilicus was found to be almost entirely a hæmatoma, between the layers of the right broad ligament, which had detached the peritoneum from the right and posterior walls of the pelvis, and partially from the posterior surface of the uterus.

The tumor was composed of large masses of fibrin, much black coagulum, and a good deal of fluid blood.

Could such a mass be disposed of except by suppuration? The mass after removal, draining of liquid, and exclusion of coagula, was larger than a child's head.

Could it have been enucleated and tied off? The hemorrhage and shock would probably have destroyed the patient on the table.

The peritoneum was clean. There were no adhesions, but the intestines were distended as before the operation.

The fœtal sac occupied an insignificant part of the tumor. The fœtus had been dead a few days only.

I have previously reported two cases of ectopic gestation in my own practice, one of which ruptured at eight weeks, and recovered without operation. The second was operated on six months after completion of the natural term of pregnancy. The latter patient was far advanced in phthisis, and the operation was done at her request. She recovered from the operation, but died a month later from lung disease—both apices showing cavities at the autopsy. The autopsy demonstrated beyond all doubt that the fœtal sac was entirely extra-peritoneal; that the gestation had originated in the right Fallopian tube, and had developed between the layers of the broad ligament, downward to the pelvic floor, laterally to the pelvic wall, and upward into the abdomen.

The case is of unusual interest, because, next to Berry Hart's celebrated frozen section, it was the first published to demonstrate an extra-peritoneal abdominal gestation. With this experience, and after much thought and study of the subject, I have but little confidence in my own ability to diagnose ectopic gestation in the early months, before the period of rupture.

Of the twenty-eight operations for the repair of lacerated cervix, all were successful, and in no case was there fever or other complication. In one case I availed myself of a suggestion made by Dr. Bache Emmet—to operate first on but one side, and several weeks later, when involution has proceeded somewhat, to close the rent in the other.

Emmet and Schatz, on the same day of the month, and in the same year, 1883, the one in Philadelphia, the other in Freiburg, read papers before societies on injury to the pelvic floor in childbirth.

Each pointed out how displacements of the pelvic viscera, and especially prolapse, were dependent much more on such injuries than upon a laceration of the perineum. One regarded

the injury as an overstretching and separation from the attachments of the pelvic fascia. The other considered it to be a laceration of the fibres of the levator ani, close to their insertion into the descending ramus of the pubes.

Subsequently Hadra, as a result of his careful and intelligent study of the subject, was satisfied that there was a true diastasis, near their sacral attachments, of the levators, and a retirement of the muscular strata toward the pubic insertion.

While this anatomical discrepancy of opinion still exists, and we are yet in ignorance of the exact nature of the injury, a decided modification of our methods has resulted, and the operations which I have been doing since Emmet's paper was published have had for their object a restoration of the support which is afforded by the pelvic floor rather than a simple restoration of the perineum proper.

In most of my cases the operation performed has been that which Emmet has described for "Prolapse of the Posterior Wall of the Vagina," and the results which I have obtained by this method have been eminently satisfactory.

In a few cases during the past year I have done Martin's operation, which is particularly appropriate when there is great relaxation of the vagina.

I may here remark that Martin's operation consists really of two operations, the first being a double elytrorrhaphy, the denudations being on each side of the columna rugarum posterior, while the second has for its object the building up of the perineum. In the second the denudation is almost identical with that of Emmet, while the suturing of one is quite different from that of the other.

In my table of operations there are five rectoplasties and four anterior colporrhaphies. These have been done according to Martin's method. This method is so simple and possesses so many merits that I can strongly commend it. It would be improper in this place to go into details which have been published elsewhere (*American Journal of Obstetrics*, October, 1887), but I may say that the peculiar features of the method are the following:

The denudation, whether it be on the posterior or anterior wall, is done with the knife, the mucous and connective tissue layers being removed so as to expose the wall of unstriped muscular fibre.

A single continuous suture of catgut closes the wound, beginning at its upper angle, working downward, and, if it be on the posterior wall, including the rent in the rectum, and finally, closing the perineum.

Suturing in layers relieves tension, brings about union over a large extent of raw surface, and avoids the formation of pockets.

The method is to be commended for its extreme simplicity, the rapidity with which it can be done, the great comfort to the patient afterward, and because there are no sutures to be removed. One requirement for its successful performance, I am sure, is good catgut.

Without intending to make invidious comparisons, I may say that the raw catgut which Martin himself prepares, Nos. 2 and 3, known by the trade-mark "Wiesener," and made by Paul Hartman, of Heidenheim, and to be easily and very cheaply bought in any of the German cities, comes very near to perfection as a ligature.

This catgut I have prepared by Martin's formula, immersing it for six hours in a sublimate solution, 1 to 1000, then removing and drying it with a towel, and, lastly, immersing it in a mixture of oil of juniper and alcohol, one to two.

After a week's immersion it is ready for use, and is then a perfect ligature—as flexible as silk, exceedingly tough, and does not disappear from the tissues under seven days.

Of the five rectoplasties, all united most satisfactorily, and were complete successes. There was perfect retention of feces and gases. In but one of the cases was there cause for anxiety. In this the operation was done to close a large recto-vaginal fistula of eighteen years' standing, in a woman who was several years past the menopause, and whose general health was completely wrecked from long residence in a tropical

climate, and from incessant headaches, which required the use of opium.

Through the fistula a large hemorrhoid frequently protruded in a half-strangulated condition; therefore, an operation for hemorrhoids was first required. Subsequently the recto-vaginal septum was divided to the fistula, the upper margin of which was one and one-half inches from the anus. The edges of the fistula were pared, and the lateral folds of the vagina denuded. The entire wound surface was then closed by the continuous catgut suture in tiers. A small fistula remained, but three months later the patient came to show me that a complete success had been accomplished, the minute opening having closed. The extreme thinness of the septum, and the abundance of cicatricial tissue near the fistula, made a successful result very improbable. In this operation of Martin for complete rupture of the perineum into the rectum, as in that of Bantock and others, no attempt is made to recover and suture the ends of the ruptured sphincter.

Emmet thinks that freshening the edges of the muscle, and bringing them into perfect apposition, are necessary.

It is difficult to prove that the atrophied fibres of the sphincter in an old laceration are ever recovered, and if they were, the union of the ends would not be muscular, but only by connective tissue. While discussing the repair of muscle in wounds, Mr. Thomas Bryant states that his observations "confirm those of Billroth, who declares that he has never seen anything which he could regard as a re-formation of muscular fibres, and that the cicatrix in muscle is almost entirely connective tissue, the extremities of the muscular fibres after division and repair uniting with the cicatricial tissue in the same way as they do with the tendons." (*Internat. Cycloped. of Surgery*, vol. ii.)

The four anterior colporrhaphies were for very extensive prolapse, and in each the denudation extended from the meatus urinarius to the cervix uteri. They were satisfactory in every respect.

During all the plastic operations herein discussed the field was irrigated by a gentle stream of pure warm water, and the wound thereby made aseptic.

After operation the only need for opium is to control the bowels, which in the rectoplasties are not allowed to move until the fifth day. Subsequently they are moved every two or three days.

No vaginal douches are used; merely irrigation of the external genitals after urination.

The rectal tube is of immense value after rectoplastic operations.

In the work herein submitted, I may state that there has been nothing like sepsis in a single case.

NOTE.—In rectoplasties, fearing a possible solution and giving way of the catgut before union is obtained, I have as a precaution passed a special suture of silkworm-gut at the anal margin through the ends of the sphincter. I think the benefit from the suture, to which Emmet attaches so much importance, is not in procuring union of the sphincter, but in holding the ends of the sphincter quiet, and thus preventing their contractions from interfering with union.

LAPAROTOMIES FOR REMOVAL OF OVARIAN TUMORS, DISEASED APPENDAGES, AND FOR OTHER CAUSES.

No.	Name.	Age.	Married or single.	Pathological condition or symptoms.	Operation.	Adhesions.	Drainage.	Hospital or private.	Recovery or death.	Effect of operation.	Remarks.
1	Mrs. L.	53	M.	Papilloma of pelvic peritoneum causing ascites.	Exploration of growth and removal of ascitic fluid.	...	No	H.	R.	Negative.	Returned home and lived one month. The papilloma sprang from the right side of the pelvis; though there were masses on the ovary it did not originate therefrom. Removal was impossible.
2	Miss B.	21	S.	Multilocular ovarian cystoma, weight 40 pounds.	Removal of tumor; remaining ovary healthy.	Yes	No	H.	R.	Complete restoration to health.	Was very feeble and anæmic before operation.
3	Mrs. B.	40	M.	Cancer of small intestine, adherent in Douglas's pouch, causing complete intestinal obstruction.	Exploration and unfolding of intestinal coils.	Yes	No	H.	R.	Clearly to prolong life seven or eight weeks.	History of chronic intestinal obstruction, with acute symptoms of complete obstruction for six days.
4	Miss T.	23	S.	Chronic ovaritis causing complete invalidism.	Removal of uterine appendages.	Yes	No	H.	R.	Complete and rapid restoration of flesh and health.	Before the operation she was a mental and physical wreck.
5	Mrs. D.	46	M.	Ovarian monocyst.	Removal of tumor; remaining ovary healthy.	No	No	H.	R.	Complete restoration to health.	

6	Mrs. S.	33	M.	Intra-ligamentous cyst with universal adhesions; a very large tumor.	Removal of cyst after 30 minutes work considered impossible; sac cleansed and drained.	Yes	Yes	H.	R.	Ten months after operation is in very fair health; small fistula 2½ inches deep remains; discharge from fistula small.	Six months prior to operation had a long fever, supposed to be typhoid. At time of operation was bed-ridden, and so feeble that she would have died on the table under a prolonged operation. Intestinal adhesions were extensive and firmly organized.
7	Mrs. P.	41	M.	Chronic ovaritis with strong adhesions.	Removal of appendages.	Yes	No	H.	R.	Was bedridden at time of operation, but two months afterward was greatly improved in health.	
8	Miss M'C.	19	S.	Ovarian cystoma of grotesque shape filled with gelatinous fluid which would not flow through trocar.	Removal of tumor; remaining ovary healthy.	Yes	Yes	H.	R.	Restoration to health slow but complete.	Patient was anæmic and very feeble; tumor weighed 30 lbs.; from character of its contents and firmly organized adhesions requiring ligatures, long incision was made. She had cough for several months after operation, and recovery was slow.
9	Mrs. C.	27	M.	Fever of hectic type for six months following parturition; tumor in left side of abdomen; symptoms supposed due to abscess.	Abdominal section; no abscess found; tumor was a mass of intestinal coils so firmly united as to be inseparable.	Yes	No	H.	R.	Gradual improvement in every respect.	Six months afterward her husband wrote that the only remaining trouble was with the bladder.
10	Mrs. B.	24	M.	Chronic ovaritis.	Removal of appendages.	Yes	No	H.	R.	Restoration to health.	Had long been a confirmed invalid; suffered constant pain, and was bed-ridden.

TABLE OF LAPAROTOMIES, ETC.—*Continued.*

No.	Name.	Age.	Married or single.	Pathological condition or symptoms.	Operation.	Adhesions.	Drainage.	Hospital or private.	Recovery or death.	Effect of operation.	Remarks.
11	Mrs. N.	25	M.	Cystic degeneration of ovaries, with prolonged hemorrhages.	Removal of appendages.	No	No	H.	R.	Restoration to health.	Ovaries were converted into cysts, and scarcely any stroma was left. The results of operation were brilliant.
12	Mrs. J.	38	M.	Large ovarian cystoma; mostly solid, requiring long incision for removal.	Removal of tumor and of other ovary, which was also much diseased.	Yes	Yes	H.	R.	Restoration to health.	Condition was so bad on admission that temporary relief was attempted by aspiration, but only one cyst could be evacuated, and operation was done next day under unfavorable circumstances.
13	Mrs. R.	36	M.	Thin walled ovarian cystoma of grotesque shape; colloid contents.	Removal of tumor and of other ovary, which was also much diseased.	Yes	Yes	H.	R.	Restoration to health.	Tumor had to be shoved through a long incision; cyst was torn in many places, and colloid contents escaped freely into peritoneum.
14	Mrs. K.	41	M.	Cystic degeneration of ovaries with severe and prolonged hemorrhages.	Removal of appendages.	No	No	H.	R.	Restoration to health.	Results of operation were brilliant.
15	Mrs. E.	27	M.	Cystic degeneration of ovaries; severe hemorrhages.	Removal of appendages.	No	Yes	H.	D.	Severe hemorrhage, source of which could not be found; death from peritonitis on fourth day.	Abdomen was reopened one hour after operation; patient pulseless and unconscious. Persulphate of iron injected through drainage tube stopped hemorrhage.

16	Mrs. B.	37	M.	Chronic pelvic peritonitis; pelvic organs so matted together they could not be identified.	Removal of right ovary, which was literally dug out.	Yes	No	H.	R.	Complete relief of all the symptoms; too short a time since operation to say more.	After one hour of hard work the right ovary was enucleated from its bed; left tube and ovary could not be identified; normal and painless menstruation three weeks after. Patient went home apparently in perfect health.
17	Mrs. T.	34	M.	Urachal fistula with umbilical hernia; the fistula, which opened at navel, was 7¼ inches deep.	Division of abdominal wall into the fistula as far as pubes; accidental opening of hernial sac.	...	...	H.	R.	Closure of fistula to a great extent; six months afterward a small sinus left which requires washing once in forty-eight hours.[1]	A hernial sac protruded at the navel, and below it on each side of the fistula, in horseshoe shape. This was opened accidentally, first on one side and then on the other, and great care was required to close these openings to prevent the stinking discharge entering the peritoneum.
18	Mrs. L.	42	M.	Pelvic abscess.	Section and drainage of abscess through the abdominal wound.	...	Yes	H.	R.	Abdominal wound healed throughout; full results cannot yet be ascertained since operation was done October 11.	Beneficial results already obtained are, relief from pain caused by abscess in left tube, and removal of obstruction to the rectum, which had almost prevented fecal discharges.
19	Mrs. B.	36	M.	Multilocular thin-walled ovarian cyst with colloid contents and universal adhesions.	Removal of tumor.	Yes	Yes	H.	D.	.....	This was a forlorn hope. Fever for two months; daily vomiting, and bronchitis produced profound anæmia. Patient never reacted well, and died twenty-four hours after operation.

[1] Complete closure since this report.

TABLE OF LAPAROTOMIES, ETC.—*Continued.*

No.	Name.	Age.	Married or single.	Pathological condition or symptoms.	Operation.	Adhesions.	Drainage.	Hospital or private.	Recovery or death.	Effect of operation.	Remarks.
20	Mrs. F.	28	M.	Chronic ovaritis with well-marked salpingitis.	Removal of appendages.	Yes	No	H.	R.	Relief of all symptoms on leaving the hospital; and will probably be completely restored to health.	Had been a great sufferer from constant pain; was bedridden and habituated to the use of opium. She had entirely lost her desire for opium before going home.
21	Mrs. H.	41	M.	Chronic ovaritis; ovaries cirrhosed.	Removal of appendages.	No	No	H.	R.	Two weeks after operation had uninterrupted convalescence.	Operation done ten days before the time for a menstrual period. A Graafian follicle had just burst on the surface of left ovary. The tubes were excessively hyperæmic.

LAPAROTOMIES FOR ECTOPIC GESTATION.

No.	Name.	Age.	Married or single.	Pathological condition or symptoms.	Operation.	Adhesions.	Drainage.	Hospital or private.	Recovery or death.	Effect of operation.	Remarks.
1	Mrs. L.	30	M.	Ruptured tubal pregnancy at tenth week.	Removed fœtus and placenta, and tied the tube.	Yes	Yes	P.	D.	Died on third day.	Difficulty of diagnosis, and causes mentioned elsewhere, were the reasons of fatal delay.
2	Mrs. K.	30	M.	Tubal pregnancy at fourth month with extra-peritoneal rupture.	Removed fœtus and drained sac.	Yes	Yes	P.	D.	Death from exhaustion.	

DISCUSSION.

Dr. William H. Wathen, of Louisville, Ky.—It will be impossible for me, in five minutes, to discuss more than a few of the many interesting points brought out in the paper which has just been read; so I will confine my remarks to the two cases of ectopic pregnancy which Dr. Maury reports.

In the first case reported Dr. Maury says that as the woman had suffered severe pain and some shock, probably he may be criticised for not having done laparotomy immediately. If this be a fault of Dr. Maury, it is the universal fault with the profession, for the operation is not usually practised by abdominal surgeons where the rupture only occurs into the folds of the broad ligaments, as evidently it did in this first case, and with no excessive hemorrhage. The second rupture was through the folds of the broad ligament into the abdominal cavity, with consequent hemorrhage and shock. Had the operation been performed, as suggested by Dr. Maury, immediately, then this case would doubtless have resulted favorably; but the chances for recovery were very greatly diminished by the necessary delay caused by the interference of the family. This is a usual obstacle to the success of abdominal surgeons in abdominal work. The surgeon has to contend with the prejudice of the patient and the friends of the family, until it is too late for an operation to result favorably; hence the great mortality that follows many of these cases.

The second operation was upon a woman who had a rupture into the folds of the broad ligament, with a large extra-peritoneal hæmatocele extending up near the umbilicus. It is not possible to have an *intra-peritoneal* hæmatocele. A so-called intra-peritoneal hæmatocele is in the folds of the broad ligament, and may press the peritoneum upward to the under surface of the liver. This is very often caused by extra-uterine pregnancy. Now, if the operation had been performed soon after the rupture, the adhesions were doubtless not so great as to prevent the entire enucleation of the ectopic gestation sac, the hæmatocele, and the ligation of the proximal end of the vessels supplying the fœtal structures. I cannot believe that the adhesions were so great at the time of operation as to have precluded this, which is the

treatment that should have been done in this case. We could not possibly have absorption of this hæmatocele, located as it was high up near the umbilicus. The only way to save this woman was to have removed all the hæmatocele, gestation sac, and the other structures.

Dr. Joseph Price, of Philadelphia.—I have here some specimens of pus-tubes, which I will exhibit in connection with what I have to say on Dr. Maury's paper, and which illustrate with how little certainty we can make a positive diagnosis of extra-uterine pregnancy. Here are two specimens: It was just as easy to say that this was a case of extra-uterine pregnancy as it was to say it was something else. The history rather indicated extra-uterine pregnancy, the patient having all the symptoms characteristic of that condition. If the woman had not had high temperature and a rapid pulse, such a diagnosis would have been justifiable.

To show how difficult it is to make a positive diagnosis before operation, I called attention to these facts before making this abdominal section, and I asked some physicians to make a diagnosis with the specimen in their hands, and no one could do it before incising it. I carefully stitched up the specimen after incising, and exhibited it to the Obstetrical Society of Philadelphia, and the gentlemen who claim to diagnose positively ectopic gestation all failed. Now, it is simply one of three things. It is a suppurating dermoid, an abscess of the ovary or tube, or ectopic gestation.

I next show you a large specimen. It is not so beautiful as it was when fresh. All these specimens show to better advantage when in a fresh water bath. You notice the adhesions here and there, and you further observe that the tube and ovary stand out prominently. This is an abscess of the ovary, and not ectopic gestation, yet the history favored the presence of the latter condition.

Dr. Maury, I believe, claimed a positive diagnosis in one of his cases, and in another his diagnostic skill was completely outwitted. He said the physician in attendance, the consultant, and himself agreed that it was unquestionably an ectopic gestation at the eighth week. He has no means of determining at the present day that it was ectopic gestation. There are a variety of troubles in the pelvis that behave like ectopic gestation, and I

claim that a positive diagnosis is impossible. Take the cases placed on record by Dr. Ely Van de Warker, in a discussion before the American Gynecological Association, and there is scarcely one that is worth the paper upon which it was written.

In regard to Schröder's position in the matter, it was always doubtful, and it is not fair to say, nor to go on record as counselling, that it is ever wise to delay in these cases. Many of these patients die suddenly. Many of them die as patients sometimes do from rupture of an aneurism or a wound from a bullet. They have no time to send for a physician. Some die at the washtub, while others die in the back yard or in the kitchen, working. This is the case with more than fifty per cent. of the cases of ectopic gestation in Philadelphia. We must act promptly to save their lives. It demonstrates the importance of promptitude, which is everything, and it is sufficient to say here that it matters not what it be. If it be a foreign body, it should be dealt with at once. It is our duty to act promptly, and if you do this you will save the lives of many patients that would otherwise be lost. Delay is dangerous, and there is just the bare possibility that if we operate in time, it takes away the feather's weight that will depress the beam.

Dr. William Warren Potter, of Buffalo, N. Y.—In response to the invitation of the President to take part in discussing Dr. Maury's very interesting paper, I return my profound thanks; and, though unexpectedly called upon, I will express myself briefly with reference to one or two points made by the author. I was particularly interested in his summary of his gynecological work. I think among most operators to-day the short incision is given the preference in making abdominal sections, and it certainly commends itself for various and obvious reasons. Again, the ligature is a matter of some importance, not only as to the material but as to its method of preparation. Dr. Maury summed up in almost a single word the idea of the aseptic silk ligature, which was a very excellent way to state it.

While on the subject of ligatures, let me say just a single word about the knot. A good deal has been said lately about knots, and it is a question that has recently attracted the attention of abdominal surgeons, particularly as to what sort of a knot is the best for the pedicle. Mr. Tait is the inventor of a knot known as the "Staffordshire," which is a very excellent one. There are

other knots which bear the names either of men or localities. The Bantock knot is an excellent knot. If I mistake not, however, it is very difficult for a person who has not seen expert operators use their various knots, to get a sufficiently accurate description of them to enable him to apply them intelligently. I would say that a simple knot of proper material well tied, and tied in the proper place, is a knot quite good enough; and in this connection I would further remark that the knot frequently used by my friend, Dr. Price, the simple figure-of-eight, affords ample security, and can be readily, quickly, and easily applied.

The question of washing out the abdomen after section, which was alluded to in the paper, is, to my mind, one of the most important points connected with abdominal work. There are many cases which we see nowadays where the abdominal cavity is more or less soiled in spite of the greatest care. I think, taking it all in all, that the idea of irrigating the abdomen with hot water after an operation has contributed as much to save lives as any one of the modern suggestions with reference to abdominal work. I may say in this connection, and by way of illustration, that quite recently it has been my lot to encounter a dermoid cyst from which more than a gallon of pus was drawn, and the woman was septic to an extreme degree before she was placed upon the operating table. The adhesions were many and very strong, requiring patience and time to separate them, and in spite of the greatest care the abdomen was more or less soiled with pus and other material; furthermore, the woman was wellnigh collapsed before the abdomen was closed. The hottest water that could possibly be borne was then poured into the abdomen, which served quickly to rally the patient from shock, and when she was taken from the operating table she was placed in bed, feeling comfortable. I believe a few years ago I should have lost that patient, as I would not have employed this expedient. I mention the case as an example of what careful work will sometimes accomplish in saving life, under the modern technique.

Intimately connected with the subject of irrigation is drainage, and, while I will not go into that question in detail at this time, I wish simply to say that the more I see of this work, the more I am satisfied that it is a desirable thing to make one hard and fast rule on this subject, viz.: when in doubt, drain.

Dr. A. W. Johnstone, of Danville, Ky.—There is one point that I would like to speak of, and that is with reference to the difficulties in the diagnosis of extra-uterine pregnancy alluded to by Dr. Price. I cannot illustrate it better, perhaps, than by referring to a case which I saw with Mr. Tait last August. The woman was in the attending physician's office at nine o'clock the night before, when nothing of the sort was suspected. The next day at one she was on the operating table, with abdomen filled with blood. A tube not larger than the end of my little finger was removed, the abdomen cleared out, and the woman put back to bed almost pulseless. She recovered. As to what caused the rupture was the difficulty. She was not six weeks past time. It took but a glance through a strong lens to demonstrate a little fœtus lying in the tube. We could see the eyes, the mouth, and all other formations. It simply shows how apt we are to let the smallest things get away from us. In that case it was impossible to make a diagnosis before operation. As far as the symptoms were concerned, the woman had none. No doubt many of these cases pass unnoticed and die suddenly.

Before leaving here in June, I saw another case which illustrates the difficulties of diagnosis in these cases. The case was this: The patient was nursing a child a few months old; she had some pains in connection with menstruation. She required some anæsthetic to relieve the pain. On examination, I found a lump on the left side. The patient quieted down and got along pretty well for a time. Shortly after she had another attack, and I came with my instruments ready to operate. By the time I reached her, she said she felt better. I allowed the case to go on for four or five days, and then, after making another examination under an anæsthetic, found that the lump had disappeared. I then left for Europe. While I was gone the patient had another attack, and another surgeon went into the abdominal cavity and found peritonitis set up, and two weeks from the time I saw the patient a tube was removed, and the case reported as one of extra-uterine pregnancy. Still another case I saw last winter, which was supposed to have been a case of fibroid of the uterus, in a woman forty years old, who had never been pregnant. The physician in attendance had been watching the tumor for weeks. The first time I saw the patient I concurred in the diagnosis. Strange to say, the woman was half insane. On my next visit I

found fluctuation in the lump in the broad ligament. An operation was not permitted, and I said the patient would die if the tumor was not removed. The attending physician tapped it with an aspirator and drew about half a gallon of fluid. The woman died. These cases illustrate very forcibly the difficulties of diagnosis of cases of extra-uterine pregnancy.

Dr. Maury.—In reference to the remarks that have been made by the different speakers, I desire to state that my position in regard to the diagnosis of ectopic gestation is entirely in accord with that of Drs. Price and Johnstone. The position I intended to make clear was this: I had no faith in my ability to diagnose ectopic gestation, in the early months prior to rupture. I think that most of us concede that with a history of pregnancy and the symptoms of intra-peritoneal hæmatocele, we can reasonably diagnose ectopic gestation.

Now, with reference to the comment made by Dr. Wathen and other speakers in regard to how I disposed of my second case, etc., I would say that it is generally conceded that in the early weeks of ectopic gestation the proper method is to shell out the sac and tie it; to detach all adhesions, and tie. In the latter months of ectopic gestation it is also conceded that, if the fœtus is between the layers of the broad ligament, we cannot shell out the sac and tie. We have to make an opening in the sac and remove the fœtus. We do the best we can with the placenta, by drainage or the method suggested by Mr. Tait.

In my second case, you will remember, I had to contend with a four months' gestation sac. I did not lose any time in that case. I made the diagnosis, and operated five days after I first saw the patient. I very anxiously sought for information with the literature at my command, to know whether any other operator had had to deal with a four months' gestation with a large tumor coming up to the navel, and which had successfully been enucleated. In such a case, the peritoneum is stripped off from the surrounding structures very extensively; if you shell out, you leave an immense bleeding surface in the pelvis, and my patient in her feeble condition could not have stood such a shock and the loss of blood which would have occurred.

One word more, and I have done. It is exceedingly difficult for any surgeon who opens the abdomen for ectopic gestation, to know what to do until he opens it.

DIRECT HERNIOTOMY.

With Reports of Cases.

By W. O. Roberts, M.D.,
Louisville, Ky.

Direct herniotomy, done with the view of effecting a radical cure, is a subject of such importance that I venture to give a brief abstract of the work of this kind that I have done during the past fourteen months.

The number of cases I offer is small, comprising a total of but ten, in which I did eleven operations. Seven cases occurred in females and three in males. Three were cases of umbilical hernia, three inguinal, three femoral, and one ventral. Six of the operations were done during strangulation, while five were performed for troublesome, irreducible hernias.

In the six cases of strangulated hernia the sexes were equally represented; three were inguinal, two femoral, and one umbilical. In five of them the operation for radical cure was done; the remaining case was one of strangulated hernia, where stercoraceous vomiting existed for eight hours before it was seen. General peritonitis was evident at the time of the operation. Much blood-stained fluid escaped when the contents of the sac were returned. Death followed in thirty-six hours. I have since thought that if, after returning the contents of the sac, I had done a low median laparotomy and washed out the peritoneal cavity, the result might have been different.

The four cases of irreducible hernia were all in females. Two were umbilical, one femoral, and one ventral. In one of the former a second operation was made necessary by the hernia recurring at the end of six months. The tumor also

re-formed at the end of ninety days in the case of femoral hernia. A second operation was not done here, because the patient has been able to get along comfortably with the aid of a truss. The remaining eight cases continue well to the present date. I have already stated that one of the cases died. The patients were aged, respectively, twenty-four, twenty-six, forty, forty-six, forty-eight, fifty, fifty-five, sixty-two, seventy-six, and eighty-four years. In the patient aged eighty-four years the hernia was inguinal and strangulated, and though presenting on the left side, both the cæcum and appendix were found in the sac.

The following is a very brief description of the different procedures practised in the several cases: In each the sac was first cleanly dissected out and not opened until hemorrhage was entirely checked. Both in the ventral and umbilical hernias the integument and fascia were divided by an elliptical incision. After opening the sac all adherent omentum was tied with catgut and excised. The remaining contents were then returned into the cavity. In one case of umbilical hernia the neck of the sac was tied close to the margins of the opening and cut away immediately in front of the ligature. The stump was then fastened tightly in the opening with silk-worm-gut sutures, and the wound finally closed by interrupted sutures of the same material. In this case no suppuration occurred, but, as already mentioned, the hernia recurred at the end of six months. In both the other umbilical and in the ventral hernias, the neck of the sac was excised on a level with the abdominal opening and sutured with catgut. The opening itself, after its edges were freshened, was closed with the continued suture of chromicized catgut in the ventral hernia and aseptic corded silk in the umbilical cases. The superficial tissues were brought together by silk sutures, which were continued down to the aponeurosis.

In the femoral hernias I adopted the practice of Mr. Mitchell Banks, which consists in freeing the sac up to the crural ring, tying it with strong catgut, and then cutting it away. No attempt was made here to sew up the ring.

In the cases of direct inguinal hernia, after tying the neck of the sac just within the ring, and removing everything in front of the ligature, the ring was closed with catgut sutures.

In the cases of oblique inguinal hernia I did Mr. Ball's operation, which, I hardly need say, consists in freeing the neck of the sac up to the internal opening, ligating it, cutting away everything in front of the ligature, then twisting the neck upon itself to effect closure of the peritoneal orifice, and finally stitching the stump to the pillars of the ring to guard the neck against untwisting itself.

Drainage by tube was secured in one case only. In the remaining operations drainage was effectually accomplished through the lower angle of the wound, this being left open for the purpose. Suppuration proper followed in no case. A small amount of pus, strictly limited to a suture puncture, was observed in two cases only—one an umbilical, the other a ventral tumor.

A detailed description of the several methods now employed for the radical cure of hernia is unnecessary and foreign to the object of this paper. Using the most general terms, however, I may say that in the operations for umbilical and ventral hernias, the difference, in any practical sense, is, after all, but little; ligation of the neck of the sac, stitching it when excised, plugging the aponeurotic opening with the sac, closing the opening with sutures, really covering the several operations. The suture material itself is somewhat more varied, embracing chromicized catgut, kangaroo tendon, silk, and silver wire.

There is a greater diversity of practice when inguinal and femoral hernias are the subject of operation. Here, in order to close the internal opening, ligatures, sutures, twisting the neck of the sac, and tucking the sac into the orifice are used; while as to the sac itself, it is removed or left undisturbed after dividing it in front of the ligature, or sutured or quilted to the pillars of the external ring. The manner of dealing with the ring also varies. Some surgeons suture it, others leave it without sutures, while others split the entire canal

and plug it with iodoform gauze, that it may close by granulation. Of one and all of these procedures it may truly be said that the prime object is to effect adequate closure of the abdominal orifice of the sac, and, by means of the needed plastic material, impart to it the strength and solidity necessary to keep it closed. The operation done and recovery effected, the question of whether the parts should be reinforced by a truss arises; and here again practice varies, some surgeons asserting that the pressure of the truss causes absorption of the inflammatory exudation, and thereby increases the probability of recurrence of the hernia; while others are equally positive that such is not the fact, but that a properly adjusted truss unquestionably tends to prevent the tumor re-forming. In a single word, however, it may be safely said that whatever operation be selected, and however skilfully executed, a considerable percentage of relapses occur, and there is no procedure which is wholly devoid of danger.

I will now give an abstract of the several cases to which I have referred in the foregoing:

Case I.—Mrs. D., aged fifty-five years. Right femoral hernia for ten years. Became strangulated forty-eight hours before I saw her, vomiting from the beginning, and stercoraceous for the past eight hours. Great abdominal distention and tenderness. Temperature 101°; pulse 120; skin clammy. Herniotomy at 1 P.M., June 1, 1889; Drs. Clemmons and Chenowith assisting. Tumor small. Knuckle of intestine completely filled the sac and so adherent as to require great care in its separation. The knuckle, though quite dark in color, was not gangrenous. When it was returned a considerable quantity of reddish fluid escaped from the peritoneal cavity. This led me to leave the neck of the sac open and introduce a rubber drainage-tube into the peritoneal cavity. The vomiting soon ceased, but diarrhœa with copious green stools followed, and death occurred thirty-six hours later.

Case II.—Mrs. H., aged fifty years, suffered with a left femoral hernia for two years. Never wore a truss. Tumor descended only after violent straining; until now patient had been able to effect reduction without difficulty. Strangulation occurred June 10, 1888—thirty-six hours before I saw her; stercoraceous vomit-

ing for the last six hours of the time. Slight abdominal distention; no tenderness. Temperature normal; pulse 112. On exposing the sac I found the condition of the hernial contents similar to those of the preceding case, though very little fluid escaped from the peritoneal cavity after the return of the hernia. The neck of the sac was ligated close to the femoral ring and the portion in front of the ligature excised. Recovery good. No recurrence up to date. Patient of Dr. Cox, of Cox's Creek, Ky.

Case III.—Mr. G., aged eighty-four years. Left inguinal hernia for past forty years; always used a truss. Hernia became strangulated June 30, 1888, twelve hours before I saw him. No stercoraceous vomiting; temperature normal; pulse 78. Contents of sac: cæcum, appendix cæci, and a small knuckle of ileum. Patient still living, with no recurrence. Patient of Drs. Grant and Palmer.

Case IV.—Mrs. I., aged sixty-three. Unbilical hernia of ten years' standing. Had been strangulated ten hours before I saw her. Contents of sac: intestine and omentum, the latter adherent to the sac. Recovery; no recurrence. Patient of Drs. Grant and Palmer.

Case V.—Mrs. B., aged fifty-two years. Large irreducible right femoral hernia of five years' standing. The tumor had been increasing in size for two years, and was so painful as to incapacitate her for her household duties. Operated August 15, 1888; recovery. Recurrence of hernia the latter part of the following November. She declined a second operation, but has gotten along comfortably since with the aid of a truss. Patient of Dr. E. L. Pearce.

Case VI.—Mrs. J., aged fifty-eight years. A small, irreducible umbilical hernia of one year's standing; very sensitive to touch. The patient had colicky pains whenever she attempted any kind of work. Operated December 19, 1888. Contents of hernia: omentum, which was adherent to the sac. Hernia returned eight months after. A second operation on July 3, 1889. No recurrence to date. Assisted by Drs. Pearce and Evans.

Case VII.—Mr. M., aged twenty-four years, had a small, oblique, inguinal hernia occurring after a violent muscular effort in January, 1889. It was replaced and gave no further trouble until the following March; while he was straining at stool it

descended. Three hours after the protrusion occurred he came to the University, being in great pain. He had not vomited. The tumor was about the size of a hen's egg and quite tense. Failing to reduce it under chloroform and aspiration, I operated. The sac contained a small quantity of reddish serum. Immediately after the operation the patient was taken in a conveyance three and a half miles, where he came under the care of another physician, who reported a quick recovery. The further history of the case I do not know.

Case VIII.—Mrs. T., aged thirty-three years; weight 212 pounds, married, but no children. Had ovariotomy performed in 1883. At the lower end of the cicatrix a small hernial protrusion formed soon after the patient began going about. This steadily increased in size, in spite of many appliances. In April, 1889, the tumor had reached the size of a small cocoanut, and the abdominal cicatrix was stretched almost to the last degree. On April 15, 1889, I did herniotomy. I have previously told how the operation was done. Recovery complete; no recurrence to date. Assisted by Drs. Pearce and Evans.

Case IX.—Mrs. M., aged sixty years. An irreducible umbilical hernia, of the size of a hen's egg, and of one year's standing; sensitive to touch, and quite painful when the patient did any manual labor. On September 29, 1889, I performed herniotomy. Contents of sac: omentum and knuckle of intestine, the former adherent to the sac. This operation has also been described. Uninterrupted recovery; no recurrence. Assisted by Drs. Pearce and Evans.

Case X.—Mr. B., aged seventy-six years; butcher by occupation. Had to give up business two years ago because of a troublesome right inguinal hernia. The hernia was strangulated in March last, but reduction was accomplished under chloroform six hours before I saw him. October 6, 1889, the hernia became strangulated. A faithful attempt at reduction under chloroform failing, an operation was urged, but declined. The following day the patient decided to have it performed. I did herniotomy forty hours after strangulation set in. Contents of sac: composed of a large knuckle of intestine, which was very deeply congested. There was about one-half an ounce of a reddish fluid and blood-clot in the sac. This operation I have described else-

where. The patient, because of an enlarged prostate, could only urinate while standing; yet recovery took place without an untoward symptom. He made a quick recovery. No recurrence has yet taken place. Assisted by Drs. Rodman and Howard.

DISCUSSION.

Dr. G. Frank Lydston, of Chicago.—I am considerably interested in the subject of what we may term normal herniotomy —*i. e.*, herniotomy in cases in which strangulation has not yet occurred. The field of usefulness of the radical operation for hernia is, it seems to me, much brighter and more comprehensive than is ordinarily supposed.

Dr. Roberts, I believe, invited an expression of opinion regarding the indications for the radical operation for hernia. As I understand the subject, I believe these indications to be: (1) In cases of incarcerated and irreducible hernia. (2) In strangulated hernia. No one, who is abreast of the times, will dispute this. (3) Cases in which the hernia is productive of great discomfort and cannot be retained by trusses; and (4) cases in which the occupation of the patient precludes conservative treatment. For example, it is easier to accomplish palliation in the better class of patients, who are not engaged in manual labor, than it is in those who work on farms or are mechanics.

With regard to the safety of the operation, I think the statistics of recent investigators and operators in this particular field show that the operation is one of the most successful—in fact, it is as promising as any of the operations which involve manipulation or operation upon the contents of the abdominal cavity. The operation is not attended apparently with as great danger as the ordinary operation of laparotomy—at least this is my inference from the statistics which I have seen.

There is a peculiar phase of practice on the part of general practitioners which I am unable to understand, and it is this: There are many practitioners who are perfectly willing to admit the legitimacy of the radical operation for hernia in its normal condition—that is, in cases of unstrangulated hernia they believe the operation to be a justifiable and scientific procedure, and send their patients to surgeons to be operated upon—and I have no

doubt that Dr. Roberts gets many such patients—yet these same practitioners delay sending such patients to surgeons who are competent to operate in cases of strangulated hernia until the last hope of recovery of the patient from an operation has been lost, or until such time has elapsed and such conditions have arisen in the field of operation as to render it absolutely impossible for us to do a modern aseptic or antiseptic operation.

The fatal results that follow herniotomy in cases of strangulated hernia are attributable, not to the operation, but to delay in operating. As a matter of fact, if the bowel has become congested and tumefied, if there has been more or less inflammatory exudate about it, or if, perchance, more or less gaseous or fluid contents have escaped from the bowel into the field of operation, it is impossible for us to make a perfectly aseptic operation, and under such circumstances we are no better off than if antiseptic surgery had never been introduced. If the operation is performed early, the result is favorable on the average.

I have done a number of normal herniotomies in which strangulation had not occurred, and I have used the method of Mitchell Banks, which is really a modification of the operation of Mr. Macewen, in that the neck of the sac is not twisted and folded upon itself.

The method of Dr. Marcy, of Boston, in which he uses the buried animal suture, and which is now before the profession, I have not tried. Next Sunday morning I shall follow Dr. Marcy's method and see what the result will be.[1]

There is one important point in connection with the operation for hernia, and that is, that it is much easier to operate where the testicle is diseased and its removal indicated. We get better results than in those cases in which these conditions do not prevail, for the reason that the stump of the spermatic cord, after the testicle has been removed, forms a barrier to the escape of the hernia in the future.

I recall a case of this kind in a young man upon whom I operated. He was kicked by a horse, and at the same time sustained an injury of the testicle, the testicle having undergone an inflammatory change—a process which we sometimes call pseudo-tubercular testis. In this case I did the Mitchell Banks opera-

[1] This operation was followed by an excellent result.

tion and removed the testicle. I found that the stump of the spermatic cord when stitched into the pillar of the external ring formed a barrier and plugged it up completely. This operation was done seven years ago, and the gentleman is carrying five silver wire stitches to this day. There was a peculiar circumstance connected with this case which I would like to have some gentleman explain. The patient had a fever after the operation, the temperature rising to 101° F., and remaining there for two or three days. One evening, while taking the temperature, I found the skin dry and burning, and I gave the patient the third of a grain of muriate of pilocarpine hypodermically. He began to perspire freely, and after this the temperature went up to 110° F. I would like to have some one explain why the temperature was so high in this case.

THE ABORTIVE TREATMENT OF ACUTE PELVIC INFLAMMATIONS.

By Virgil O. Hardon, M.D.,
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The views held by gynecologists in regard to acute inflammation in the female pelvis have, within the past few years, undergone a radical change. The inflammatory processes formerly regarded as idiopathic, or, at least, as primary affections, are now almost universally recognized as dependent upon antecedent disease in the ovaries or Fallopian tubes, especially the latter. This change of opinion has been, to a very large extent, the result of advances in abdominal surgery, which have enabled the conditions of the pelvic organs to be studied in the living subject, by immediate inspection and palpation, instead of through the medium of the vaginal tissues. Consequently, it is found that the change of opinion on this subject has been most marked among those men who have had large experience in abdominal work. The diagnostic value of abdominal section, under such circumstances, is almost as great as that of *post-mortem* examination, and, hence, the opinion of the laparotomist is entitled to very great weight. As a result of this mode of observation, the conclusion cannot be avoided that acute pelvic inflammation is, at least in the majority of cases, associated with septic, gonorrhœal, tubercular, or some other form of inflammation of the tubes.

The acceptance of this theory has led to the adoption of a line of treatment which has proven its correctness, and which has produced results often brilliant, and nearly always satis-

factory to both physician and patient. This treatment consists of the removal of the diseased organs by laparotomy; such removal being usually followed by a cessation of the inflammatory process, and a speedy and permanent restoration to health. This treatment so commends itself to the reason upon theoretical grounds, and is followed by so excellent clinical results, that it may truly be said that he who rejects it carries conservatism to a fault, and is not open to conviction.

But, unfortunately, it is not always practicable to adopt this line of treatment. In the first place, such attacks usually occur suddenly, and the patient comes under the care of her family physician, a general practitioner, it may be, who possesses neither the courage nor the skill to attempt a laparotomy. The patient may be too far from a city to obtain the services of a specialist, or her pecuniary condition may be such as to render that course impossible. To her, therefore, this door to relief is practically closed. In the second place, the announcement to the patient that an abdominal section offers the only means of cure often falls with the startling effect of thunder from a clear sky. The magnitude of the operation appears to her entirely out of proportion to the gravity of the affection, and she decides that the remedy is worse than the disease. If the operation is urged, she passes from observation, and seeks the aid of a physician who is more willing to accommodate his treatment to the views of the patient. Moreover, even though the physician be a skilled laparotomist, and the consent of the patient be gained, the period of election for such an operation is not at the height of an acute inflammatory attack, but rather after the violence of the inflammation has abated. It often happens, therefore, that the physician is constrained to adopt a line of treatment less radical and less rational, and which shall be simply palliative in its nature.

But under such circumstances he is at once confronted by the well-recognized fact, that to allow the inflammatory process to pursue its natural tendency to self-limitation is to expose the patient to sequelæ which may be more disastrous

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than the acute inflammation itself. In the majority of cases inflammatory exudations are thrown out which persist more or less permanently, producing distortions, constrictions, and obstructions of the pelvic organs, interfering with their vitality and their functions, and jeopardizing comfort, health, and even life. If an operation be ultimately determined upon, it will often be found that these exudates have so matted all the parts together, so altered their relations and changed their physical conditions, that the recognition of the organs to be removed is rendered impossible, or, if they are recognized, their removal cannot be accomplished.

For these reasons an obvious and important *desideratum* is the discovery of some method by which acute pelvic inflammations may be shorn of their dangerous features without resort to laparotomy. If the exudation into the pelvic tissues can be prevented, pelvic inflammations will become comparatively trivial and innocuous affections, and will be of importance only as indications of more serious disease in the tubes, of which the inflammatory attacks are but unimportant incidents. To show how this object can be accomplished shall be the purpose of this paper.

There are two forms of inflammation which are recognized as occurring within the pelvis as a result of tubal disease, pelvic cellulitis and pelvic peritonitis. In many cases both forms of inflammation are simultaneously present in the same subject, and it is not improbable that in all cases when either is present, the other also exists in a greater or less degree. It is hardly possible, when one considers the anatomical relations of the pelvic cellular tissue to the peritoneum, to conceive of an inflammation of the one structure without a greater or less implication of the other. But in the majority of cases one form of inflammation can be recognized as forming the preponderating element of the disease, to which the other plays only a secondary *rôle*. The two affections are accordingly distinguishable to some extent by their symptomatology and to a greater extent by the signs presented upon physical examination.

Although some authors strenuously insist that "pelvic cellulitis is practically a myth," yet the best authorities recognize the possibility of its existence in connection with tubal disease. Its occurrence in the acute form has been demonstrated both by abdominal section and by *post-mortem* examination. It has a characteristic clinical history and presents physical phenomena which are not found in acute pelvic peritonitis or acute salpingitis when occurring alone. The course of the disease presents three stages, viz., a stage of effusion, in which serum from the blood is poured out into the meshes of the pelvic cellular tissue; a stage of solidification, in which the cellular tissue is filled with a solid exudate of plastic lymph; and a final stage, in which this exudate either undergoes absorption or breaks down into pus. These three stages are recognizable clinically. The stage of effusion is of short duration, usually lasting from twenty-four to forty-eight hours. During this stage a vaginal examination will show the roof of the vagina to possess a boggy, œdematous feeling, and to be so swollen that it is almost or quite level with the external os, so that the cervix feels as if it were drawn up into the surrounding tissues. This swelling may be found behind the uterus, upon one or both sides, or in all three localities. The uterus is still movable, but its movements give great pain.

After a period of from twenty-four to forty-eight hours the swelling subsides and the portions of the roof in which it existed will be found filled with a solid exudate which is hard and unyielding to the touch, and which effectually destroys the mobility of the womb. This exudate is after a time gradually absorbed or else breaks down into pus, forming a pelvic abscess.

Embedded within the exudate lie the ovaries, the tubes, and the bloodvessels, lymphatics and nerves of the pelvic organs. The cellular tissue undergoes cicatricial contraction as the exudate is absorbed, and such contraction draws the uterus from its normal position, constricts the ovaries, causing atrophy and degeneration, occludes the tubes at one or more

points, interfering with the escape of their secretions by their natural channel through the uterus, and deranges the circulation, the nutrition, and the innervation of the pelvic organs, with impairment of all their functions.

The constitutional symptoms consist of acceleration of the pulse, elevation of temperature, severe pain in the pelvis, extending down the thighs, tenderness of the hypogastric and inguinal regions, a sense of weight and fulness in the pelvis, difficult micturition, and painful defecation. These symptoms are most marked in the first stage, and are somewhat diminished as soon as solidification has taken place. They continue, however, with lessened intensity far into the third stage of the disease.

On account of the brief duration of the first stage it often happens that the patient is not seen by the physician until solidification has taken place. It is unfortunate that this is so, since it is only during the stage of effusion that treatment can be successfully applied for aborting the inflammation. If the effusion into the pelvic cellular tissue can be gotten rid of, the disease is cut short, the second stage does not occur, and after a brief convalescence the patient is restored to her usual health, with her pelvic tissues in as good condition as before the occurrence of the attack. The opportunity for the adoption of a line of treatment which will accomplish this end occurs most often in private practice, where the patient comes under the care of the physician at the commencement of the attack.

The treatment consists in the withdrawal of the effusion from the cellular tissue by means of the aspirator. It is accomplished in the following manner: The patient is placed across the bed in the dorsal position with the hips near the edge and the legs flexed. The vagina is syringed out with a warm antiseptic solution, and the hands and the aspirator are also rendered thoroughly aseptic. A finger introduced into the vagina locates the effusion by the œdema of the vaginal roof, and also serves as a guide for the introduction of the needle. The instrument which I use is an ordinary exploring

aspirator. The needle is thrust into the cellular tissue to a distance of about half an inch and the piston withdrawn until the fluid ceases to flow. The needle is then reinserted at successive points until the swelling and œdema are felt to have disappeared. I have found that three punctures on each side of the uterus are usually sufficient, and if the effusion is present behind the cervix, one or two additional punctures in that locality are also required. The fluid which is withdrawn is a bloody serum, varying in quantity from one to two fluid-drachms at each puncture. As a rule, it is not necessary to anæsthetize the patient, although I have sometimes done so on account of extreme nervousness and dread of the operation. The pain is not severe.

The relief which follows the withdrawal of the fluid is immediate. The patient usually falls into a quiet sleep, which is in marked contrast to the pain and restlessness which had previously existed. The pulse and temperature rapidly decline, the acute pain gives place to moderate tenderness upon pressure, the constitutional symptoms disappear, and in forty-eight hours the patient feels as well as before the commencement of the attack. The most gratifying result of this treatment, however, is found in the fact that subsequent vaginal examination will show that no solidified plastic lymph remains in the pelvic cellular tissue to give rise to troublesome sequelæ. A slight thickening at the site of the former œdema is all that is left as a reminder of the acute inflammation. If, as is usually the case, disease of the tubes had previously been present, this condition is still found to exist. The effect of the aspiration is simply to cut short the acute inflammatory attacks and not to remove or even palliate its cause.

In a correspondence upon this subject with Dr. J. M. Baldy, of Philadelphia, he suggested to me that the use of Epsom salts, in sufficient quantity to induce free catharsis, would have the same effect as aspiration in aborting this disease. I have tested the value of this suggestion in a sufficient number of cases to convince me that, while the use of salts controls to a very great extent the pain and constitutional

symptoms, it does not prevent the deposit and solidification of plastic lymph in the cellular tissue. It is, therefore, much inferior in value to the use of the aspirator.

The second form of pelvic inflammation which may be associated with disease of the tubes, and which is much more frequently met with under such circumstances than pelvic cellulitis, is pelvic peritonitis. The constitutional symptoms in this affection are very similar to those of cellulitis, since in both they are the result of the inflammatory process. In peritonitis, however, there is usually a greater amount of nausea and prostration. By physical examination the diagnosis may be more conclusively established. The finger in the vagina will detect a thickening in the tissues of the vaginal roof, with excessive pain upon pressure. There is, however, in this affection, an absence of the boggy, œdematous feeling which is so prominent a feature of pelvic cellulitis. In fact, the absence of this condition is almost the only decisive diagnostic point of distinction between the two varieties of inflammation. In pelvic peritonitis there is undoubtedly a serous exudation into the peritoneum which gravitates into the pelvis. But it is impossible to detect such fluid when it is free in the peritoneal sac. Lymph is thrown out upon the serous surfaces of the pelvic viscera by which they are agglutinated together, producing adhesions which subsequently undergo contraction, forming bands which may often be detected by the finger in the later stages of the disease. Or these adhesions may result in the matting together of all the pelvic viscera into an inextricable mass. The results of such agglutination are disastrous in the extreme, impairing function, deranging circulation and innervation, and causing pain by constriction and pressure. The presence of such adhesions also forms a serious obstacle to the removal of the diseased tubes, should such a procedure be subsequently determined upon. Hence to abort the disease and prevent the development of such untoward sequelæ become matters of as great importance in pelvic peritonitis as in pelvic cellulitis.

The adhesions which occur in pelvic peritonitis are due to

the lymph which is thrown out by opposing serous surfaces. The removal of such lymph by mechanical means is an obvious impossibility. To limit its formation as far as possible by cutting short the inflammatory process is all that can be hoped for. My experience has proven that this can be accomplished. Taking a hint from the suggestion of Dr. Baldy, referred to above, and also from my experience in the treatment of the acute peritonitis which sometimes follows abdominal section, I have, during the past year, been treating all cases of acute pelvic peritonitis which have come into my hands in the early stages by active catharsis.

As soon as the disease is recognized, I commence to give teaspoonful doses of Epsom salts every hour, dissolved in water as hot as can be swallowed, until watery stools are induced. From five to eight doses are usually required, and are followed by several copious evacuations in rapid succession. If the patient has previously taken an opiate for the relief of pain, a larger number of doses is necessary. As soon as free catharsis takes place, the pulse and temperature begin to decline, and within twelve hours the fever is abated, the pain is relieved, the nausea and prostration disappear, and the patient goes on to a rapid convalescence. The relief is so immediate and so marked, that the patient fully recognizes its dependence upon the treatment, and I have a number of patients who are subject to recurrent attacks of pelvic peritonitis from diseased tubes, who have learned to abort such attacks by immediately resorting to Epsom salts without calling in a physician.

I have found that successive attacks, when cut short in this way, do not lead to an increase of the amount of plastic deposit in the pelvis; but, on the other hand, the depletion which follows the use of the remedy seems to diminish such deposits. By this fact I have been led to adopt the plan of giving to my patients frequent repetitions of this course of treatment in the intervals between the acute attacks, with the effect of producing a more rapid absorption of such deposits than I have been able to accomplish by any other method.

I could cite a large number of instances in which I have successfully used these two methods of treatment. I will, however, report only two cases, for the purpose of illustration:

Case I. *Pelvic Cellulitis Treated by Aspiration.*—Mrs. M. W.; multipara; has always enjoyed good health until her present attack. On the 29th of September, 1887, after a long and fatiguing walk, she was seized with pain in the pelvis, most marked on the left side and extending down into the left thigh. During the night the pain rapidly grew worse, so that she was unable to sleep. Micturition became extremely painful, and an action of the bowels, which occurred during the night, gave her great distress. The abdomen became excessively tender and high fever developed. I saw her on the following day and found her tossing in bed and moaning with pain. The face was flushed, the skin hot and dry, temperature 102.6°, pulse 136. She complained of pain throughout the whole pelvis, but particularly in the left groin and hip. Examination showed the vagina to be hot and dry. On the left side of the cervix the vagina was œdematous and swollen, and the condition extended behind the cervix into Douglas's pouch. The uterus was pushed over toward the right side of the pelvis. The womb was movable, but its movement gave great pain. The pelvis was everywhere very sensitive to pressure. With strict antiseptic precautions an aspirator needle was thrust into the cellular tissue at four successive points, and about six drachms of bloody serum withdrawn. The patient at once experienced relief and soon after sank into a quiet sleep, which lasted nearly three hours. When I saw her six hours later the temperature had fallen to 99.4°, and the pulse to 94, and she was almost entirely free from pain. She slept all night without an anodyne, and the following day her pulse and temperature were normal and she was anxious to get up. I enjoined quiet for several days, but on the third day after the aspiration I met her on the street and she declared that she felt as well as she ever did in her life. Two weeks afterward I made a vaginal examination and found no trace of hardness in the roof of the vagina and perfect mobility of the uterus. The left Fallopian tube could be felt to be enlarged, but was not tender to pressure. I have seen the patient at intervals since, during a period of two

years, and she has had no recurrence of the inflammation in that time.

CASE II. *Pelvic Peritonitis Treated by Active Catharsis.*—Mrs. W. R. H., aged twenty-eight years, has borne two children at term. In June, 1889, she aborted at about two months with excessive hemorrhage, but made an apparently good recovery. On the 21st of July, while engaged in domestic duties, she was seized with severe pain in the pelvis, which rapidly increased, with the development of high fever, thirst, nausea, and great tenderness of the abdomen. Micturition was painful, the bowels constipated. I saw her the following morning. She was lying on her back with her knees drawn up, and the expression of her face denoted intense suffering. The abdomen was tympanitic and very tender to the slightest touch, especially in the lower portion. She had vomited during the night and was still nauseated. Temperature 103.2°, pulse 142. By vaginal examination the whole pelvis was so sensitive that little could be determined beyond the fact that no œdema or swelling existed in the roof of the vagina, and the womb was somewhat movable. The slightest pressure caused her to cry out with agony. I at once gave her a teaspoonful of Epsom salts in hot water, which was repeated every hour until eight doses had been taken. By the following morning she had eleven watery evacuations, some copious and others scanty. When I saw her on the next day the temperature had fallen to 99.8°, and the pulse to 102. The tympanites had disappeared and the pain nearly. The tenderness had notably diminished, so that I was able to make a satisfactory examination and to determine the existence of a double pyosalpinx. She made a rapid convalescence without further treatment beyond keeping the bowels moderately loose by occasional doses of salts, and in five days was able to resume the duties of her household with perfect ease and comfort. In September, during my absence at the North, she had a second attack similar to the one just described. At the commencement of the pain she resorted to the same remedy which I had prescribed, and the disease was aborted in a few hours.

DISCUSSION.

Dr. Joseph Price, of Philadelphia.—In the second case reported by Dr. Hardon, if I mistake not, after the patient had apparently been relieved, he discovered a double pyosalpinx. This woman may yet have a sinus in one groin or the other, or three sinuses, one in the cæcum, one in connection with the bladder, and another in the bowel, and the pus escaping through these openings. This is not an exaggerated picture. I have seen it a good many times. I will briefly relate an experience.

Thirteen years ago a woman living in Pottsville, Pennsylvania, went to a prominent gynecologist in Philadelphia; a sponge-tent was introduced, an angry peritonitis followed, and the patient made a doubtful recovery. Eight years ago Dr. Goodell effected drainage through many sinuses then existing; there were three or four about the sacral region, two or three in the groins, and one about the anterior abdominal wall, and she rapidly improved. Six weeks ago I evacuated two gallons of pus from this woman.

If we pause for a moment, we shall see that this woman suffered the tortures of the damned for thirteen years. The final relief she obtained was simply by means of abdominal section. The woman is well to-day. My experience is not that of the essayist, nor am I willing to adopt the treatment recommended by him. The relief from salines and the use of the aspirator in both cases reported may have been justifiable, but pus tubes call for abdominal section, so did the salpingitis.

I now show you a pus tube seven inches in length, looking like a bagpipe. The history of this case was similar to that cited in one of the cases of the essayist. The temperature and pulse were precisely the same. This case occurred in a prominent courtesan. The woman had suffered from recurrent attacks of pelvic peritonitis or pelvic cellulitis for eight years. Her urethra had been cut away, her vagina and bowel mutilated, and yet no one had discovered the lesion.

I desire you to look at these specimens, because they are interesting in connection with typical cases of pelvic inflammation, as described in the paper of Dr. Hardon. I have had such cases

repeatedly. Some of them refuse abdominal section because, after sending them to the hospital, they were comfortable. Again, I have had patients leave the hospital after free purgation, stating that they felt absolutely comfortable.

In this connection I would like to give a word of caution as to preparation. If you recognize a pus tube on one side or the other, I would not hesitate to operate at once without giving the woman a chance to change her mind. You operate to save life. The aspirator I never use. We have gone into the abdomen over three hundred times for pus, and in ten per cent. of the cases only were we mistaken in our diagnosis; and it is only fair to say that when we found pus tubes we never hesitated to operate. Some of these specimens—the two abscesses of the ovary—belong to Dr. Goodell. This abscess of the ovary which I show you was removed on Friday last. It demonstrates how often it is that the ovary is completely disorganized in chronic cases. In post-mortem cases sometimes you will not find the semblance of an ovary.

Dr. Hardon speaks of passing the aspirator half an inch through the cellular tissue. You will please bear in mind the researches of Bernutz and Goupil as to the quantity of cellular tissue you find in the broad ligaments. It is not more than a covering in that part of the broad ligament. It is scarce cellular tissue that we find in the folds of the broad ligament, and it exists about the uterine portion only to a noticeable degree. I must say that I am not prepared to call any of the doctor's cases recoveries. In short, they are cases which will remain under treatment for many years; they will suffer from recurrent attacks of pelvic inflammation, and if the doctor himself does not operate some one else will. A case that Dr. Thomas treated in his private sanitarium for pelvic cellulitis five or ten years ago, I operated upon about ten days ago. This patient went through every conceivable variety of treatment lasting for ten years. It is exceedingly common in these cases to find multiple abscesses or pus tubes. You will probably have an abscess of the ovary and a pus tube; you evacuate one, and you leave two. These cases of vaginal drainage are just the kind you will have to deal with in pelvic surgery. They will tire you. After you have been in the pelvis often you will soon realize you have a new experience. You will find that it requires more than vaginal

drainage, aspiration, and sometimes electricity to deal with such cases.

In the light of our present accurate knowledge, acquired by a long and large experience in the pelvis, we are driven to the conclusion that the entire subject of pelvic peritonitis and cellulitis will have to be re-written. Sharp distinctions between pelvic cellulitis and peritonitis are refinements of diagnosis that we no longer seek. Peritonitis the result of tubal and ovarian disease is exceedingly common. Gonorrhœa is the most common cause of all. I do not wish to be misunderstood in this discussion. I refuse many operations. I do not wish you to understand that I would operate for ovaritis and salpingitis, for if I did I should operate on more cases than I do. Hundreds of cases of ovaritis and salpingitis and hysteria do not require an operation to save life. I am not doing such operations. I am operating precisely for conditions in which pus tubes and other specimens which I showed you are found, where it is not difficult to recognize them, and where you can put your fingers upon them. In the pus cases I strongly counsel that you remove such foreign bodies; do not allow pus to remain anywhere in the body.

Dr. George J. Engelmann, of St. Louis.—I have been intensely interested in this discussion and fascinated with the remarks of Dr. Price, whose results we all know to be among the best. There is a fascination in his methods and results, and also in the results of other workers in the gynecological surgery of the present day, and I am prompted to ask, Is not the pendulum swinging too far in that direction? I endorse every word which Dr. Price has said when referring to pelvic inflammation as the *result of salpingitis*, but I am not ready to say that such is the case in every suppurative pelvic inflammation. I regretted to hear Dr. Price speak of parametritis and cellulitis as one and the same thing. I know that this is the theory as held by some operators; there is no question as to the prevalence of gonorrhœa, hence of salpingitis and parametritis. The great mass of cases of purulent accumulation in the pelvis, called pelvic cellulitis in a general way, are the sequence of salpingitis, or of pus in the tubes; but, to my mind, accumulations of pus in the pelvis exist without salpingitis, and we generally see them following labor, surgical interference, or traumatism. There is no doubt that if we suspect the tube to be the source of such disease, we must

remove it at once, and not hesitate, and I must say I like Dr. Price's suggestion of not waiting to prepare the patient until we have relieved her and made her comfortable. We will make her comfortable for the time being, and she will reconsider the question of operation; I constantly see this. She considers herself doing well enough until the next impulse comes. Some of the forms of pelvic cellulitis I look upon as cases of peri-uterine inflammation; these we see in parturient women. We have recurrent attacks of pelvic cellulitis which simulate those forms which are due to salpingitis, and in such cases the removal of the tube will do no good whatsoever. In removing the tube, with its causative condition, we relieve the patient and free her doubtless from the recurrence of severe attacks. I am very much inclined to look to the tube as the cause of pelvic inflammation, because, when such is the case, we have a means of curing it, which we have not when the pelvic inflammation is traumatic or due to infection directly through the lymph channels, as in the after-operation or puerperium, and the tube is free from disease. I have had a very striking experience of that kind in a patient who for years had been treated at my clinic. She suffered from recurrent attacks of inflammation in the pelvis, tenderness, severe pain and burning fever, and distinctly revealed an enlargement of the ovary with thickening of the tube; she was a fleshy woman, so that I could not make a very perfect diagnosis, yet this I took to be the condition, and such it proved.

If we take the history of cases of pelvic inflammation following salpingitis, we find precisely these symptoms; and, to my mind, this was undoubtedly a case of pelvic inflammation from tubal disease, and I acted upon this supposition and removed the ovaries and tubes, and yet they were not the centre or cause of the trouble, and the patient is in exactly the same state to-day as she was before the operation. What was the pathological condition and what was the result of the microscopical examination of the tissues removed? The tube was diseased, its walls thickened, its mucosa free, it was implicated from without. The disease had extended from the pelvic viscera to the tube, and not from the tube to the surrounding tissue. The case was a most instructive one.

The lining membrane of the tube was in an absolutely healthy condition; the delicate folds within the tube were not in the

least disturbed; but the walls were thickened, the inflammation having come from without, extending from the broad ligament to the adjacent structures. The tube was affected, but it was merely implicated as one of the pelvic tissues; the lining membrane was intact, the structures approximating the normal as they approached the cavity. If we examine a gonorrhœal tube, a pus tube, such as leads to pelvic peritonitis as it appears in the early stages, you will find that the tube is diseased from the inside, and even when the tube itself is not yet so thoroughly affected—when it is merely thickened without a sac formation, merely with a thickening of its tissues, microscopical examination will show from whence the disease came, whether from the uterine cavity and the lining membrane of the tube spreading outward, or, as it does in cases of pelvic cellulitis, from without inward. If the tube is free, or if it is merely implicated as a part of the pelvic tissues in the pelvic inflammation, then its removal will do no good whatsoever. The removal of the tube and ovaries will stop the recurrence of the monthly congestion of the pelvic viscera, which may, to some extent, aggravate and excite pelvic inflammation, but the cause has not been removed.

I do believe that the brilliant results achieved by the removal of pus tubes and ovaries, together with the operation for ectopic pregnancy, are among the most striking features of recent progress. I fear, however, that these brilliant achievements have forced a great many operators into the belief that all pelvic inflammations originate from the tubes, which will lead to much mischief, and which, most assuredly, is not the case. Whenever we can make a positive diagnosis that the tube is the cause, its removal by the knife is unquestionably the proper method to adopt; puncturing, electricity, and medication will only give temporary relief. But I am convinced that as soon as this novel and dangerous theory has run its course, the pendulum in its never-ceasing motion will return to its equilibrium, and these extremists will return to the proper treatment of these cases just as they are now treated by the mass of practitioners.

Dr. Price.—I wish to reply briefly to the remarks of Dr. Engelmann. I am aware that there are hundreds of women put upon the operating table without the patient knowing what is to be done and what is to be removed. Professors A. Reeves Jackson and Theophilus Parvin have called attention to such mutila-

tions in very able papers. Then, too, there are cases in which the diseased conditions are such that nothing short of an operation will cure them. We cannot condemn too strongly the indiscriminate removal of the ovaries and tubes in nervous disturbances without the patient knowing what is to be done. Another point equally important is, What becomes of the class of cases that refuse operation? This is a question that some may ask. You have seen a large number of patients in whom you have counselled operation and they have refused to submit to it, the patients having been benefited by some local and general treat-treat. In my experience, in several instances when pain has developed, a carriage has been sent for me to come and see such patients, probably six months after I suggested abdominal section, the patient being in the midst of a peritonitis, with a high temperature and rapid pulse. I could show you dozens of specimens of large pus tubes removed from such patients.

Dr. Engelmann.—I hope that I have not been misunderstood. There is no doubt as to the propriety of operation in such cases as have been presented and referred to by Dr. Price and others, and they are fit subjects for surgical interference long before the disease has developed to such an extent. Every case which originates from gonorrhœa, or from other infection, extending from the vaginal tract through the uterine mucosa and tubes, then to the peritoneum, is a fit case for operation. But cases of purulent pelvic inflammation exist which do not originate in this way, and these cases will never be benefited by a removal of the tubes. Removal of ovary and tube will no more benefit a case of simple pelvic abscess, of parametritis ending in suppuration, than it will benefit a perityphlitic abscess. Such abscesses may be reached by laparotomy, but not by removal of the tubes, and I trust that the dangerous and extreme views of Dr. Price will not receive the approval of this Association.

Let me be thoroughly understood. I do not disapprove of laparotomy for the cure of pelvic abscess of any kind if it does not absorb and cannot be reached by other means. I have had the most admirable results in cases of suppurative cellulitis and have saved life by emptying the abscess by abdominal incision; but I am not willing to permit the extreme statement to go unchallenged that such abscesses must necessarily result from salpingitis. The question of the cleansing of pelvic abscesses by laparotomy

is a very different one, and has no connection with that of the origin of such abscesses.

Dr. Hardon.—I thank Dr. Price for emphasizing so completely what I said in the early portion of my paper. He has simply repeated in the discussion what I had already said—namely, that cases of tubal disease admit of but one rational treatment, and that is, removal of the tubes. I stated that in order that my position might not be misunderstood, and I supposed that that fact was so patent and so in accord with the tenets of modern gynecological practice, as to render it unnecessary for me to dwell further upon it.

I have a collection of pus tubes which will compare in a striking manner with those which Dr. Price has exhibited today. My custom is invariably to remove them, but I cannot always do this, for the simple reason that my patients will not permit it. What shall we do with those patients who decline to be operated upon? I have no doubt that there are patients in Philadelphia, Birmingham, and Nashville, as there are in Atlanta, who, having pus tubes, will not listen to the suggestion of operation. If you should mention it to them, it would doubtless be your last visit to their houses. If you advise and caution such persons about an operation they will say, "I will not permit it; nothing will induce me to undergo an operation." It is of such cases that I spoke in my paper.

The case which I reported in which there was double pyosalpinx, I could have operated upon only by decoying the patient from her home, inveigling her into my private hospital, etherizing her by force, and committing a rape of her tubes and ovaries, so to speak. Shall I, when I find a woman in an attack of acute peritonitis, say to her, "If you do not let me operate on you, I will leave you?" Gentlemen, which of you would do that? If she will not let me operate, if she will not listen to suggestions of an operation, I consider it my duty to palliate her sufferings and to bring her through the attack as best I can; and it is for the purpose of meeting such cases that I advocate the treatment which I have described in my paper.

As to the amount of cellular tissue in the broad ligaments, I admit all Dr. Price has said regarding that point, provided it is in normal condition. When it is so swollen and infiltrated as in cellulitis, as is proven by the fact that you can draw serum with

the aspirator to the extent of eight drachms or more, is it to be supposed that the bulk of the cellular tissue, the space occupied by it, is the same as when it is in its normal condition?

As to the invariable dependence of pelvic inflammation upon disease of the tubes, I am satisfied, as Dr. Engelmann has said, that there are cases of cellulitis without antecedent disease of the tubes. I have had what I consider conclusive proof of that fact in my experience in two cases which were reported to this Association at its last meeting in Birmingham. I have had two cases of pelvic cellulitis with all the symptoms I have described in my paper, in which I aspirated and withdrew several drachms of serum from the cellular tissue, where, on examination of the patient two days afterward and at subsequent periods, there was absolutely no disease of the tubes to be detected. I have at intervals examined these patients with reference to their condition up to the present time, and there has not been the slightest evidence of disease of the tubes and no recurrence of the pelvic inflammation. I consider these cases pelvic cellulitis without tubal disease. Suppose there are pus tubes, and we find the patient in the midst of an attack of acute inflammation, in the second stage of cellulitis, where the whole pelvis is filled with a deposit of plastic exudate, which some liken to a plaster-of-Paris bandage around the pelvic organs—you have all seen such cases—I claim there is no man living who can map out pus tubes in the midst of a mass of exudation of that kind and differentiate one from the other. That there are cases in which such disease occurs without pus tubes, it is rational to assume. We may in some such cases be justified in going into the abdomen; but is it not more reasonable in the first place to endeavor to abort the inflammation and get rid of the deposit of plastic material and then make our diagnosis?

THE IMPROVED CÆSAREAN SECTION VERSUS CRANIOTOMY.

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To the obstetric surgeon, but more particularly to the parturient woman and her unborn child, the subject is one of commanding importance, and will be now calmly and dispassionately considered.

This paper is not intended to be a compilation from medical records or statistical evidences, but is rather intended to quicken the active and growing sentiment against the various operations which involve the destruction of the living child, a practice which, though repugnant to all the better instincts of our nature, received the sanction of such high authority that it was almost the universal practice for centuries.

Taking a retrospective view of the whole field of obstetric medicine, with the facts now before us, we think much can be done for the good of humanity. In action it has never reached its fullest capacity for work. In achievement it has never reached the fulness of its power.

The great difficulty which has confronted us as practitioners has been the want of adequate knowledge as to the possibilities which the comparatively recent improvements, with increased knowledge, better facilities, better instruments, more perfect technique, and a greater confidence in the outcome of all capital operations have inspired.

It is a conceded fact that the greatest obstacle to delivery, in an overwhelming majority of cases, is some deformity of the pelvis. When the obstruction is insurmountable, its

nature and extent should be determined before any attempt at artificial delivery is made. It is evident that our surgical endeavor will be most intelligently and effectually applied when based upon a full and accurate knowledge of the nature and extent of the obstacle to delivery.

That we may obtain a clear and comprehensive conception of the best means at our command to overcome the difficulty, it is necessary to consider the claims which the forceps, version, craniotomy, gastro-elytrotomy, the improved Cæsarean section, the utero-ovarian amputation, or the total extirpation of the uterus has to priority, with due regard for the life of both *mother* and *child.*

The sentence of condemnation which was passed upon woman relating to the tree of knowledge, was that "in sorrow she should bring forth children." This literally means, that notwithstanding all the enchantments of beauty, the joys of love, and the delights of the nuptial bed, the portal of life is presided over by anguish and danger.

Around the beauteous love of maternity the pangs of anguish ever hang. The sharp cry of the parturient mother, borne upon every breath of air, rings out around the world as it has from the beginning and will until the end.

To prevent this anguish we have yet no remedy. The angel of anæsthesia, indeed, hangs over the couch of motherhood, but the pangs and perils still abide, exciting the sympathy of the accoucheur in behalf of the mother, while the child comes into the world sprinkled with its mother's blood, receiving its life at the jeopardy of hers, even in normal, uncomplicated labor. But what horror and responsibility crowd around the couch of motherhood when nature has not her usual course, by reason of malpresentation, pelvic distortion, or rather obstruction to labor, which come in as factors of suffering, danger, and death.

Here the accoucheur has a responsibility second to none in the whole range of human duty. Two lives hang upon the grappling-hook of his judgment. To stand worthily by the couch of the parturient woman with these environments, he

must be thoroughly equipped with diagnostic skill, accurate anatomical knowledge, and mechanical ability, preceded by profound study, yet he must have a sense of conscientious duty and consider well between the destructive operations of the past and the conservative methods of to-day.

Between these two operations much difference of opinion has ever existed. Therefore, he must decide between them, and at the peril of human torture, danger, and it may be of death.

When Baron Larrey approached the great Napoleon during the labor of Marie Louise, with the question as to which life the Emperor desired to be saved in the event the dread decision was forced upon them, Napoleon replied: "Do not be alarmed, regain your self-possession and professional nonchalance. Forget that you are accouching the Empress and giving birth to the King of Rome. Treat my wife as you would a bourgeoise of the Faubourgs. Then, if one life must be sacrificed, it is the mother's right to life that must prevail, she must have the preference."

The result is historical; doubtless Napoleon's coolness and nerve restored courage to the physician and contributed to the result.

The wonderful influence which the great name of Napoleon wielded in his day doubtless contributed to the general and sweeping canon that the mother has the prior and superior right to life; but this opinion does not commend itself to the unqualified acceptance of the medical profession, nor to our brothers of the sacerdotal cloth. The great Catholic Church of imperial Rome, that great conservator of force, that most ancient of all forms of polity, coming down to us through so many centuries, and so full of human impulses, and yet regardful of the sacred soul that is in both fœtus and mother alike, affirms, through the Theological Faculty of Paris, "that if it is not possible to extract the infant without killing it, it is not possible to extract it without mortal sin." I am in full sympathy with the humane impulse which prompted this statement, and deplore the obstetric dicta which require

that the fœtus should be sacrificed to save the mother. Life is the gift of God, and no man has the right to destroy one life to save another except it be in self-defence. So long as the life of the mother was made to depend on the death of the fœtus, but little advance was made in prolonging the one or preserving the other.

The advance of the art and science of obstetrics no longer justifies the needless sacrifice of hecatombs of unborn children. The first right of the child is to be born. It may seem Utopian to demand that this right be respected, but as Cæsar paused on the brink of the Rubicon, so should others pause ere they say the "die is cast." In remote antiquity many women perished in the travail of labor without artificial aid. But as the science and art of obstetrics advanced surgeon-midwives attempted various expedients.

Tradition has it that Julius Cæsar received his surname by being like the charm-destroying MacDuff "from his mother's womb untimely ripped." During the Middle Ages the operation of craniotomy so greatly increased that version was a "lost art," and the forceps were for the time completely buried in oblivion. About the time Baudelocque and his contemporaries flourished craniotomy was recognized as a highly scientific procedure, and the destructive operations were practised with such apparent recklessness that, when its results were considered, they were too appalling to contemplate. Forty to fifty per cent. rates of mortality are allowed by him and Rokitansky to have followed. Playfair says, after alluding to the great destruction of fœtal life, that "we could not look back to it without a shudder," and asserting that "craniotomy was performed three or four times as often as forceps delivery," that, "fortunately, professional opinion has completely recognized the sacred duty of saving the infant's life whenever it is practicable to do so; and British obstetricians now teach, as carefully as those of other nations, the imperative necessity of using every endeavor to avoid the destruction of fœtal life." Again, he says that "at one period out of 21,867 births in

the Dublin Rotunda Hospital, the forceps were never once applied."

Still later, it is certain that craniotomy was performed three or four times as often as the forceps were employed.

Yet, notwithstanding such positive statements, child-murder has been too often the order of the day, since their enunciation; and, until the advent of antiseptic methods, the death-rate for mothers after embryotomy was fearful; since which time, however, it has been reduced to almost *nil.*

With the revival of the Cæsarean section by Sänger, his improvements in the technique of the operation, and the use of antiseptic methods, the light of day began to dawn upon the bloody path of craniotomy, and it has continued to grow brighter, until it seems likely to culminate in the acceptance of the improved Cæsarean section, where the child is living and the obstruction to delivery is insurmountable, thus lifting from the shoulders of the obstetrician the terrible yoke they have so long borne.

To sacrifice deliberately the life of the child with the hope of saving that of the mother, should long since have been relegated to realms of desperate expedients, wholly unjustifiable.

The pathetic emphasis of the illustrious Meigs, who refused to perform embryotomy for a historic patient for the third time, sinks deep into the heart of every true philanthropist.

The success of Gibson in delivering her of living children by the Cæsarean section, before it had reached its present perfection, comes to us a psalm of life and a song of victory, foreshadowing that the hosts of science would, at last, cross the Red Sea, in whose waves of blood they had waded so long.

When the improved Cæsarean section was first brought to the notice of the profession by Sänger, in 1880, it seemed as if he had captured, as if by a sudden dash, the grim outworks of the citadel of death, so long frowning upon the birth of life.

All over Europe and America antiseptics—the abbreviated name of the angel of cleanliness—is hovering over the bed of maternity, protecting both mother and child from many of the ills that flesh is heir to. In the Cæsarean section the office of

the physician is to save the lives of mother and child. He is not the executioner. That life, which he did not give, and which he must not take, is left in the keeping of its Author, the Almighty God, in whose hands, in spite of the utmost medical skill, are the issues of life and death.

The killing of children, at the call of scientific necessity, was always of doubtful propriety and a temptation to reckless and destructive methods that has always borne bad fruit.

Who has the right to decide which of two living beings shall die? Who ever exercised such a prerogative with perfect assurance that he was right?

The improved Cæsarean section offers justifiable means of saving both mother and child, and relieves the heart and conscience from the charge of scientific murder.

Embryotomy on a living child will soon cease to be regarded as a scientific or even a justifiable operation. This seems to be foreshadowed by the statistics of Caruso, "who reports a case in detail by Sänger and one by Zweifel, and adds statistics up to October, 1888, comprising 135 cases. Six successful cases were known, in addition, to Caruso, but the details necessary for publication were lacking.

German operators have performed 74 of these operations, Americans 18, Austrians 16; the results obtained by Americans are inferior to those of the Germans and Austrians. The results show 74.44 per cent. recoveries among mothers in all cases, and 91.72 per cent. recoveries among children. In three cases in which the operation was done the second time both mothers and children recovered.

It may, therefore, be said that a mother has three chances out of four and her child nine out of ten for life with this operation. A careful estimate of the results of craniotomy under antiseptic precautions shows that 93.04 per cent. of mothers recover. Selecting similar cases on which section was performed, the percentage of recoveries in these cases was 89.04 and 100 per cent. of children.

Caruso concludes, therefore, that craniotomy on the living child is to be superseded by the conservative operation.

From the foregoing estimate I deduce the following:

Given 100 cases of obstructive delivery requiring either the destructive or the conservative operation; by the former 93 lives will be saved, by the latter 165—only a difference of 72 lives saved by the Cæsarean section out of 100 deliveries. Statistics, favorable as they are, will in the near future show still greater success when the operation by the improved Cæsarean section becomes more fully established. Because in many cases it is now resorted to as a necessity and not as a choice, after the mother has been exhausted by ineffectual efforts at delivery when the obstruction rendered it impossible. When the obstetrician discovers the obstruction to be insurmountable, he will not hesitate or delay, but select one of the conservative methods and perform it with every advantage that such an operation would have over one forced upon him after the parturient mother had been stretched upon the rack until strength and hope have almost fled.

By the revival of the Cæsarean section an intelligent foundation has been laid as a basis upon which the true philanthropist can labor in behalf of children yet unborn.

False views have bridled science for centuries. Let science dictate for awhile and when results are known men and angels will rejoice.

Wise conclusions are always based on accurate knowledge, the results of which can only be reached by scientific methods. Before conclusions can be effectual the knowledge must be public; it cannot be technical with the public, but it must be general, and relate to the results which have been reached.

The public and the profession have always accomplished much when working together. When this is effected still greater achievements may be won, and the destruction of an unborn child will be known no more in the land. The outcome of the general adoption of the improved Cæsarean section, with its substitutes and various improvements for the destructive operations upon the living child, would add immeasurably to the span of human existence and render the cry of distress and wail of bereavement still less, until in swelling

chorus will be heard the merry laugh of children, the sweet voices of young men and women, and the triumph of older men and matrons, saved to the world by the interposition of science.

The requirements of the accoucheur in this, "the scientific period," are high and difficult of attainment, but they are such as to excite the ambition of youth and the emulation of genius. Once attained, he confidently enters the lying-in chamber with wisdom to differentiate and nerve to act in the interest of both mother and child. While his patient is still full of hope and courage he will relieve her of her burden with the keen blade of scientific mercy and snatch her child from the domain of death, thus giving maternity and childhood alike the same chance for life, condemning neither; thus taking from the sacrificial surgeon the blood of babes. No Herods will be known reeking with the massacre of innocents in the halcyon days to come.

TREATMENT OF ECTOPIC PREGNANCY, WITH REPORT OF A CASE.

By William H. Wathen, M.D.,
Louisville.

We cannot adopt the best treatment in ectopic pregnancy unless we know its pathology as taught by the most correct observers; a failure in this particular has resulted in a variety of methods of treatment, and this applies as well to men of recognized ability in obstetrics and gynecology. There is, however, nearly a unity of opinion with physicians who recognize that all cases are probably tubal in their origin; they oppose the use of electricity, or any other means to cause infanticide, except laparotomy, for the removal of the fœtus and the membranes. Thomas, than whom there is no better authority in gynecology, teaches the old classification of Parry and Dezeimeris. He speaks of an impregnated ovum "attaching itself primarily to the peritoneum," and of a "fœtus and placenta entering the peritoneal cavity by rupture and developing there." No ovum has ever attached itself primarily to the peritoneum, nor is it possible for it to do so; nor has a placenta become separated from its attachments to the tube and *then* attached itself to any other structure. An ovum cannot become fixed to any structure until it is held firmly and immovably, and a placenta once separated is always separated, just as in uterine pregnancy. The placenta may finally attach itself to nearly any abdominal viscera by making epiphytic inroads upon other structures, and it may gradually become partially or *possibly* entirely detached from its tubal connection. It is seldom, if ever, attached by villous projections to

the abdominal surface of the peritoneum, but grows to the tissues or viscera under the peritoneal covering by gradually stripping it from its abdominal or visceral connection. The gestation sac may adhere to any part of the abdominal surface of the peritoneum and become fixed to the viscera or abdominal walls, but this attachment is of the same character we find in pelvic and abdominal tumors, and not by the growth of chorionic or placental villi.

The old classifications were mainly based upon post-mortem observations made by men not trained in pathological and microscopical research, who could not accurately distinguish the tissues often matted together and entirely changed in physical appearance.

Thomas's report of a four-pound placenta attached to the entire extent of the colon from caput to sigmoid flexure, does not indicate that the ovum was primarily fixed to the peritoneum, or that a tubal pregnancy ruptured into the abdominal cavity; it reached the colon, as it reaches other viscera, by slowly stripping the peritoneum off the bowel and fixing its villi into the muscular tissue of the gut, or it may have become adherent by pressure just as any other abdominal tumor. It may be possible for a ruptured tubal pregnancy into the peritoneum to continue to develop, and for the placenta to attach itself gradually through its villi to the abdominal or visceral surface, but I doubt if we have any positive evidence that this has occurred. There seems to be evidence, however, that the fœtus in the latter months of pregnancy has ruptured through the folds of the broad ligament into the cavity of the abdomen and continued to develop, but the placenta did not follow it.

The divisions and subdivisions of ectopic pregnancy, as found in most standard text-books, tend to confuse the medical mind, for such classifications are not sustained by facts correctly observed. Thomas, in speaking of the difficulty of determining how to classify cases of ectopic pregnancy, says: "Nothing is more delusive than post-mortem examinations

when practised by one unequal to the task which he undertakes."

As the treatment of ectopic pregnancy at different stages of fœtal development varies according to the conditions we are to contend with, it is well to adopt something after the following arrangement:

1. Treatment before primary rupture of the tube.

2. Treatment after rupture into the folds of the broad ligament, and before the period of fœtal viability.

3. Treatment where the sac ruptures into the peritoneal cavity.

4. Treatment after fœtal viability and at full period of gestation.

5. Treatment after death of fœtus at or before the full period of gestation.

Rupture of the gestation sac nearly always occurs before the end of the third month, and it is doubtful if a diagnosis of ectopic pregnancy can be positively made before that time. Of course, subsequent results may demonstrate the correctness of a diagnosis before the end of the third month, but the symptoms upon which the diagnosis is made are not different from what may be caused by other diseased conditions.

The following from Thomas indicates that he entertains doubts about being able positively to diagnose ectopic pregnancy in the early months: "After all is said in regard to the diagnosis of ectopic gestation, it must be added that a positive conclusion is very generally difficult and often impossible." A correct diagnosis can hardly be made unless the membranes expelled from the uterus are shown to be decidual in a careful examination by an experienced microscopist. With this exception neither the subjective nor the objective symptoms are pathognomonic; the same rational and physical signs may be observed in other cysts, tumors, or deposits in the pelvis. I believe that in some of the reported successful cases following the use of electricity, the women were suffering with other forms of pelvic trouble. Lawson Tait has operated for ectopic pregnancy nearly fifty times, but he has never diag-

nosed a case until after rupture of the sac. So, if this difficulty in diagnosis is usual with experienced gynecologists, it is not probable that the average general practitioner could often make a correct diagnosis. A rapid decrease in the size of other pelvic tumors or deposits, and a decided improvement in the local and general condition may be caused by a healthful stimulation by the faradic current, or the electrolytic effect of the galvanic current.

But assuming that a diagnosis has been made, what plan of treatment should we adopt? There are two recognized methods: To remove the gestation sac by laparotomy, or to destroy the life of the fœtus and leave it and the membranes in the cavity to be absorbed, to become encysted, or to suppurate and discharge through some of the viscera or through the abdominal walls. Electricity is the only fœticidal means now recognized as orthodox. The especial advocates of this in our country are Thomas, Mundé, Lusk, Garrigues, York, and Mann, though it has been tried by others here and abroad, and successful results are claimed.

Thomas says: "A diagnosis of ectopic pregnancy being arrived at, destroy fœtal life as promptly as possible." Also, "unless the imminence of rupture renders fœticidal efforts hazardous and delay for this purpose unadvisable, the life of the fœtus should always be destroyed prior to fœtal viability, before laparotomy is resorted to."

I enter a protest against such treatment, and waiving the moral aspect of the question, insist upon substituting laparotomy, and the entire removal of the gestation sac, because it will give much better immediate and subsequent results.

Dr. Harbert, in 1849, Kiwisch, in 1857, and Stephen Rodgers, in 1867, suggested and advocated laparotomy in ruptured ectopic pregnancy; but I find no record of any one recommending the operation before rupture in the early months, until I suggested its propriety before Tait did his first section for ruptured tubal pregnancy. Before primary rupture of the sac the adhesions are very few, and the removal of the fœtus and membranes by laparotomy is so simple and

so devoid of danger in the practice of an experienced operator, that the mortality would be reduced to a minimum; it would be less than the mortality following the use of electricity. Thomas reports twelve cases treated by electricity without a death. If he were correct in his diagnosis he could have gotten as good immediate results by laparotomy, and the subsequent condition would have been much better. I believe it is possible to reduce the mortality in such cases by laparotomy to one per cent. in the practice of experienced and successful abdominal surgeons. It may be contended that these patients cannot always be operated on by experienced men; nor can electricity be always used by men who are familiar with its successful use in such cases. If it is necessary to refer the woman to some specialist in laparotomy, it will as often be necessary to refer her to some specialist in electricity, who has all the electrical appliances necessary for good results in such work. The services of a man experienced in abdominal surgery may be obtained as easily as the services of a man experienced in the use of electricity. If the woman recovers from the immediate effects of laparotomy she is permanently cured, and the diseased tube being removed, she cannot have a recurrence of pregnancy or disease on that side. Electricity may cause rupture of the tube, or the sac may rupture after death of the ovum, the result of contractions of the muscles of the tube in an effort to get rid of what is then a foreign body, just as in intra-uterine pregnancy. Rupture at three or four weeks would be as fatal as at three months; and unless the ovum is removed, it may cause serious or fatal complications, and until removed the woman's life is at the mercy of accidents over which we have no control.

Cases are reported where these women continued to suffer so intensely after electrical fœticide, that it finally became necessary to remove the diseased structures by laparotomy. The placenta may continue to grow after the death of the embryo or fœtus, and when finally separated may cause death by secondary intra-peritoneal hemorrhage, by septic infection, or by the formation of pelvic abscess. If the operation is not

done until these women have fallen into a state of chronic invalidism, it will be complicated by the formation of adhesions, and the results will not be good. Dr. Joseph Price removed an ectopic gestation sac September 11, 1887, before rupture or partial rupture of the tube, and before the fourth month, but he was not positive in his diagnosis until he had removed the cyst. I can find no other case of the kind recorded.

The advocates of electricity have not generally recommended its use after the fourth month, but it has occasionally been used in advanced pregnancy as a preparation for laparotomy, believing it would also kill the placenta and lessen the dangers from hemorrhage in a subsequent abdominal section. In such cases the use of electricity would necessarily be dangerous, for the fœtus and placenta could not be killed unless the electricity is conveyed by acupuncture into the sac. If ectopic pregnancy continues beyond four and a half months, it will generally not rupture and will go to full term, so that a laparotomy may be done in the interest of both mother and child.

Again, if the pregnancy continues in the folds of the broad ligament to four and a half to five months, the physician will frequently have no opportunity to use electricity until term, possibly not until after term, for these women will not always consult the doctor until they are suffering labor-pains, or until they cease to feel motions of the child, and think they have gone beyond their time. After rupture into the folds of the broad ligaments the treatment should *usually* be expectant until fœtal viability, and laparotomy should not be done unless rupture appears imminent from over-distention, contractions, or the life of the woman is in jeopardy. The life of the child should be an important element where it is possible to save it without greatly increasing the dangers to the mother, and as the prognosis is not materially greater in a laparotomy at the eighth or ninth month than at the sixth month, the child should not *usually* be removed until it is viable. If the woman is even under our immediate observation after the primary rupture into the folds of the broad ligaments, an ectopic pregnancy cannot always be distinguished from an extra-peritoneal hæma-

tocele until advanced to four and a half or five months, when the fœtal movements are felt, or the fœtal heart-sounds are heard; and in an extra-peritoneal hæmatocele the treatment should be expectant. Only the minority of the one in four cases of ectopic pregnancy that rupture into the folds of the broad ligaments go to term; the majority perish and are absorbed with the hæmatocele, and may cause pelvic abscess, or remain quiescent as a lithopædion. But if the tube ruptures into the peritoneum, unless abdominal section is done, death is the alternative.

Tait has seen over 100 cases, and they all died except those upon whom he operated; and Goupil has seen no case recover. The experience of these men accords with the experience of all men who have correctly observed the results of intra-peritoneal rupture. The symptoms are so distinctive that a diagnosis is easily made; it could only be confounded with intra-peritoneal hemorrhage from other causes; but the indications for treatment in each instance would be the same—open the abdomen and arrest hemorrhage. Intra-peritoneal rupture does not generally cause death suddenly; in the majority of recorded cases it did not occur until from four to twelve hours after rupture; thus giving sufficient time to open the abdomen.

Tait says: "In very many of these cases a feature of great interest is the fact that the first attack of hemorrhage is generally not fatal, and that the records yield incontestable evidence that it may require the repeated occurrence of bleeding to bring about the fatal issue." Having diagnosticated intra-peritoneal rupture of the tube, or of the folds of the broad ligament, there is now no difference of opinion as to the indications for treatment. Open the abdomen at once, unless shock is so great that the operation would cause immediate death; in this condition resuscitate the woman before operating.

The mortality in all cases operated upon is 4.70 per cent., while the mortality of cases treated by expectancy is practically 100 per cent. Tait reports forty-two operations with but two deaths. His first operation resulted fatally because he did not then know how to treat the cyst, and in another

case he operated on a woman in such profound shock that she was unable to rally.

The indications for the operation are:

1. To control hemorrhage.
2. To extirpate the sac and other injured structures.
3. To cleanse the abdominal cavity aseptically and prevent septic infection.

Peritonitis should not be a frequent complication, for in post-mortem examinations in tubal rupture the peritoneum has generally been found healthy.

In laparotomy "all the possibilities are under the control of human intelligence," and "nothing is left to chance;" "it enriches our resources in cases of impending danger," and by it we can diagnose ectopic pregnancy where no fœtus can be found. The fœtus was absent in most of Tait's cases, but he found a placenta or fœtal membranes in all of them.

Where the fœtus is developed in the folds of the broad ligament laparotomy should not be done until after the eighth month, unless rupture of the sac is imminent, or the woman's life is in danger, or the fœtus dead; for this delay does not add materially to the dangers of the operation, and is greatly in the interest of the child. Nor should we delay the operation until the beginning of false labor, for the prognosis would then be much less favorable for mother and child. The discouraging mortality in the primary operation, as shown by the statistics of Kiwisch, Henning, Hart and Barbour, is largely due to this delay, as the children were often dead or too feeble to live before they were removed, and in many of the cases the mothers were *in extremis;* the operations were also crudely done, and hardly any two were by one man. Recent statistics indicate such encouraging results in the primary operation that there are now but few operators of recognized ability who recommend the secondary operation. In most of the successful secondary operations the women had fortunately escaped the usual complications that cause death, and firm adhesions had shut off the peritoneal cavity, so that the operation was comparatively simple, being little more diffi-

cult than opening a large pelvic abscess that had become adherent to the abdominal walls; but one-third of the cases where the primary operation is not done die without any operation. The hemorrhage is generally much less in the secondary operation, because the death of the fœtus is usually followed by diminished placental vascularity, gradual atrophy and shrinkage; but this is not always true, and death from hemorrhage in placental separation has occurred in the practice of experienced operators many weeks after the death of the child. If the operation is done before the end of the fifth month for rupture into the abdominal cavity, or for other reasons, before primary or secondary rupture, the incision should be made in the mesial line between the umbilicus and the pubes, and the fœtus and the membranes removed. Hemorrhage is not necessarily an ugly factor here, for if the membranes are rapidly and carefully separated down to the broad ligament, both ends of the vessels supplying the sac can be ligated and dangerous bleeding controlled. It is necessary to ligate the broad ligament *en masse* so as to include the vessels as they enter and leave the placenta, for if we ligate only the proximal end of the ovarian artery, we may have fatal hemorrhage from its uterine end, because of its intimate anastomoses with the vessels entering the uterus between the folds of the other broad ligament. In other particulars the operation is similar to an ordinary abdominal section.

If the operation is not done until after the child is viable, it is best to avoid the peritoneal cavity by entering the gestation sac where it is adherent to the anterior abdominal walls, two or three inches from the linea alba. This is especially the correct treatment if we do not intend to remove the placenta, for if the peritoneal cavity is opened the membranes should be removed, if it is possible to do so without causing fatal hemorrhage. It has not been decided by experienced operators just what is the best way to treat the placenta. Martin, Tait, and others have removed it successfully, but our means to control hemorrhage at this stage of pregnancy are so unre-

liable that there is always great danger of death from loss of blood.

Again, if the placenta is left *in situ* to slough and come away through an opening in the incision, the process is long, tedious, and exhausting, and very often causes the death of the woman.

Tait has recently recommended cutting the cord short and leaving the placenta in the sac to be hermetically sealed in an aseptic condition, after a fashion that he described. This is an excellent way to treat the placenta if it will prevent suppuration, so that all the membranes may finally be absorbed, but experience will have to decide the value of this method of treatment. The removal of the membranes would be the ideal operation if we had positive and reliable means to control hemorrhage; and maybe some one will discover how this can be safely done. In the meantime the method of treating the membranes must be selected by the operator to meet the indications in any particular case. The vessels may be ligated *en masse*, separate bleeding points ligated, or hemorrhage controlled by styptics, such as iron, vinegar, or actual or galvanic cautery.

In conclusion, I will report a successful abdominal section for an ectopic pregnancy at three and a half months:

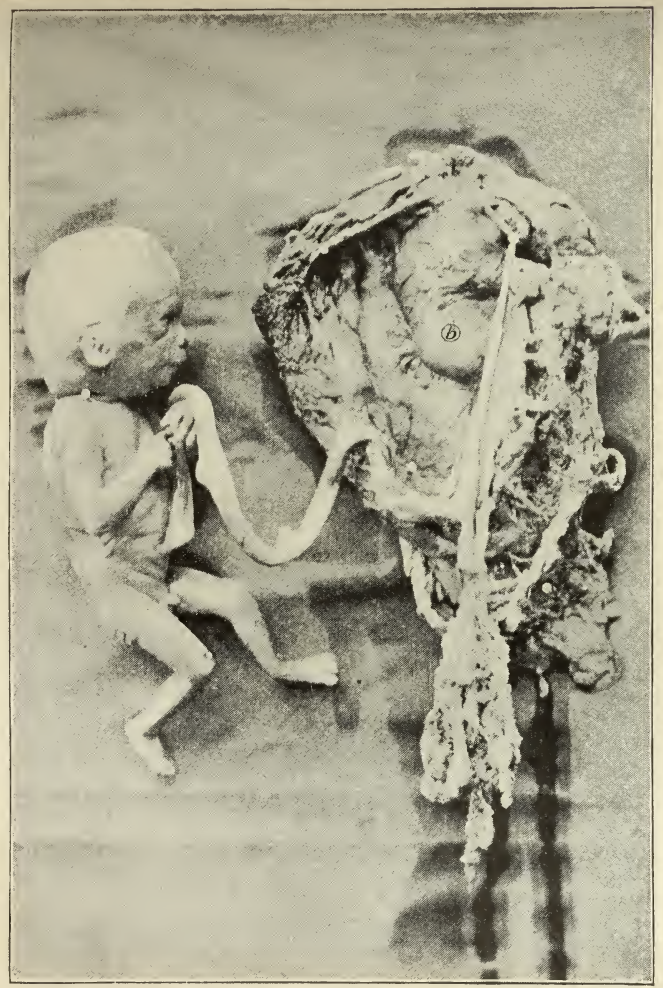
On Nov. 17, 1889, I was called by Dr. H. K. Pusey to see Mrs. T., from Southwestern Kentucky, She was thirty-two years old, had been married twelve years and had never been pregnant. After a careful examination we diagnosed ectopic pregnancy at about three and a half months; Dr. W. O. Roberts also examined the woman and concurred in our diagnosis. There had been no symptoms that positively indicated primary rupture of the tube, but the woman was suffering so much from mechanical pressure on the pelvic organs, and from sharp, cutting pains in the region of the tumor, that we thought it unwise to allow the pregnancy to continue. An abdominal section was done on November 19th. The uterus was five and a half inches deep, was very large and was adherent to the abdominal walls on the left side nearly up to the umbilicus, and three inches of small

intestine were firmly bound to the walls between the uterus and the mesial line. The pregnancy was in the folds of the right broad ligament and the sac was adherent to the uterus, the pouch of Douglas, and the right lateral walls of the pelvis. The adhesions of the uterus and sac were quickly separated and the fœtus and placenta pulled out through the incision, with no attachment left except to the broad ligament. A double ligature was applied and the membranes cut away. Bleeding did not amount to more than a few ounces, and the woman was put in bed with a pulse of 80 and with no shock. A drainage-tube was used for nearly a week, and at no time was there any untoward symptom consequent upon the operation. On the fourth day, and for a week afterward, she had an exhausting diarrhœa and passed several large, round worms. After the diarrhœa had been controlled she began to complain of severe pressure upon the rectum and bladder, and on examination a large hæmatocele was found in the left broad ligament pressing low down into the pouch of Douglas. This finally suppurated and discharged into the rectum, and the patient is now convalescent. I was assisted in the operation by Drs. H. K. Pusey, A. M. Cartledge, and Henry Orendorf.

The accompanying plate was made from correct photographs of the specimen.

This is my second operation within six months for ectopic pregnancy, and in both cases the conception was in the right tube, and the uterus was pushed to the left side and extended nearly up to the umbilicus; and I wish to emphasize the fact that it was about as large as in an intra-uterine pregnancy at a corresponding period, and in general appearance identical.

In a careful examination of the specimen I find conclusive proof that conception began in the outer third of the tube, but ruptured into the folds of the broad ligament, where it continued to develop.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PERINEORRHAPHY.

By A. W. Johnstone, M.D.,
Danville, Ky.

As I reached Nashville to-day it was a source of regret that circumstances had forced me to come before you with only the skeleton of a paper. But since the discussion of Dr. Maury's paper this morning so thoroughly opened up my subject, I am rather glad not to be tied down to any set speech, and wish you to consider what I now have to say as the continuation of that debate.

I grew up in the New York school of gynecology. The first lectures on the subject I had were from Prof. Thomas, and as Prof. Goodell's pupil at a still later period, you may be sure that I was thoroughly indoctrinated with all the teachings of what has been called the "American school." With such beliefs, like Dr. Price, when I first saw Tait's operation, where a rectocele is present, I did not like it. In that talk he has referred to, I agreed somewhat with his views, but told him then that I believed that Tait's method could be so modified as to make it as good for rectocele cases as it undoubtedly was for tears of all degrees of the true perineum.

This statement I am now here to make good. For the three years that have elapsed since then I have been doing all my plastic work by the flap-splitting method. Not only for its ease and simplicity for the operator, but in its immediate and secondary results for the patient it far surpasses all methods that have yet been suggested. The Tait operation has been so often described that I will leave it with what I have already

said, that for all degrees of tear of the perineum alone it is to me the most satisfactory.

When we come to injuries of the pelvic floor, whether they be breaks of the levator ani muscle or slits in the pelvic fascia, the real pathological condition is closely analogous to a hernia, and it would be just as sensible to remove large quantities of integument covering the hernial sac, when operating for its radical cure, as it is to cut away the mucous membrane covering a rectocele. The best way to do both is to raise the superficial tissues, and when the deep ring is repaired to close the skin over it.

The way I have been doing this for rectocele is to begin as though I were going to do a Tait operation for an incomplete tear of the perineum, and to push the dissection far along the recto-vaginal septum until the crest of the rectocele is almost reached. Do not simply raise the vaginal mucous membrane, but with a finger in the rectum divide the septum half way between the vagina and rectum, so as to get well into the torn ends of the injured structures. If the injury is more to one side than the other follow it up, and be sure that your incision includes all of the broken structures. Also be certain that you do not buttonhole either vagina or rectum, and that the only access foreign fluids can have to your cut will be through its external opening. When this is done begin below, start your first stitch as Mr. Tait does, just inside the skin, and bury it in the tissues all the way around the cut, though not going quite to the top of the rectocele, and bring it out on the opposite side at the corresponding point. Your second stitch should reach the top of the rectocele. Put in as many stitches as the case may require, but be sure that none of them enter either rectum, vagina, or upper part of your cut, but lie buried in the undisturbed tissues, closely adjacent to the cut. When these stitches are tied they have the advantage of drawing equally in all directions, and not only drawing down the rectocele, with its torn fascia, to the perineum, but they bring in the tissues from the sides and thus close the hole in the pelvic floor through which the rectum has been protruding. The

vagina, which before the operation ran parallel with the rectum, is now raised to the position of the hypothenuse of a spherical triangle with its concavity upward, and forms a roof over the stitches and protects them thoroughly from the secretions of the genital tract. By closing the gaping parts of skin-flaps as Mr. Tait does, we have completed an operation which is merely an extension of his and restores as completely as any herniotomy can do the original position of the torn tissues. In women past the change of life who have that relaxed, flabby state of tissue which sets in at forty-five, and especially where there is a coexisting cystocele, I close the perineum so that in the dorsal position the urethra will just peep over its top, and thus at one operation do what used to take two, and much more satisfactorily than when we used to operate on the cystocele itself.

The principal advantage of this over all the previous operations that I learned from the Eastern school is, less pain and worry to the patient, and the certain and solid union obtained from converting it into a simple cutaneous incision instead of a wound of a secreting viscus. The hole in the pelvic floor can be much more accurately closed by stitches which lie in the same plane and completely encircle it, than by interrupted ones which cross it at a right angle, as is done by Emmet's operation. The world owes him a debt of gratitude for pointing out this operation, but I am sure that its repair is much more satisfactory when done by the rules which apply to all other forms of herniotomy. The permanence of the results is assured, for in the last few days I have seen several of the patients on which this operation was first done and it was impossible to tell that any of them had ever had a rectocele. The pain, as Tait has shown, was much less directly after the operation, and their convalescence much more rapid. Their vaginas have lost nothing, and consequently are in much better condition to stand future labors than if the apparent redundancy had been removed. For what we have been taught to believe was a surplus, after all is merely the unfolding of the natural waves of the vagina, and to excise them is

merely to insure a repetition of the accident at the next labor.

Sometimes we find keloid and other new-growths in the scars left from tears of the perineum, and of course they occasionally must be removed, but a simple non-adherent cicatrix never does any harm and should be left alone.

Piles, though, should always be taken off with the cautery, for a simple eschar gives much less trouble than an inflamed hemorrhoid.

Coincident trachleorrhaphy should be done with pure fine silk, which I sometimes leave for two or three weeks, by which time the new perineum will stand the speculum.

Keep the vagina clean by two douches daily and give an enema every morning.

By these methods we can return the damaged mother to almost her virgin usefulness, and by its ease to the operator and satisfaction to the patient, it seems to me that there is little more for either to desire.

DISCUSSION.

Dr. B. E. Hadra, of Galveston.—Dr. Johnstone's operation I advocated myself years ago. It is, therefore, not new to me. It is sound in its principles. Its aim is to unite the levator ani muscles to a certain extent, where they surround the vagina behind, and thus to form a new support and a firm partition between vagina and rectum. The tear in the raphe of the diaphragm, though, is mostly situated behind the rectum and not between this and the vagina. From such reasons we cannot get at it through the vagina. It would take an additional incision through the rectum. Therefore, I accept Dr. Johnstone's operation, but not his anatomical explanations.

Dr. William H. Wathen, of Louisville.—The splitting process is the rational method of bringing about union of raw perineal surfaces. Under no circumstances could I be induced to remove any tissue in doing perineorrhaphy except where there is a jagged edge that cannot be correctly approximated. I readily conceive how Dr. Price arrives at the conclusion that the splitting process

is of no value, because the mind of the medical profession has been confused about that matter. I think the cause of this confusion is mainly the result of the almost universal reference to Tait's method by surgeons who are trying to follow what they suppose Tait does. I have seen more than a dozen descriptions of Tait's operation, and I do not believe it possible to understand just what his method is, as the descriptions differ in essential points. I am free to say, however, that Tait's operation of to-day was not Tait's operation of yesterday, and while he now does a good operation, originally his operation did but little good where perineorrhaphy was indicated. There are a great many surgeons who can split surfaces just as well, and get as good results, as Mr. Tait does. I do not think Mr. Tait should be accorded all the credit of having instituted the splitting process. We have men in this country who have done a good deal in that particular line.

I use the buried catgut suture and the kangaroo tendon, which are readily absorbed and cause no local annoyance. The silk-worm-gut cannot be absorbed, and if buried causes as much trouble as the silver wire.

I cannot speak positively as to bringing the sphincter ani muscle together by the buried suture. I have always supplemented the buried suture by using one wire suture. I have never failed to get control of the gases and feces, except in one case, where the woman masturbated every day after the operation.

Dr. Joseph Price, of Philadelphia.—I scarcely agree with Dr. Wathen that there is still confusion about the matter of the splitting operation. My friend, Dr. Hadra. has written much of great value on the subject of injuries of the pelvic floor and diaphragm, and long since it has been accepted all over the world, and we will thank him for what he has contributed; but for him to say there is an underlying principle in the procedure of the flap-splitting method after contributing so much valuable material to our literature in regard to injuries of the pelvic floor, makes me regret very much that he should confine his remarks to any skin procedure on the perineum, and not to the lesions of which he has written so exhaustively. The point upon which the flap-splitting methods are done are far removed from the lesions he long since recognized, and many others since have followed in his footsteps.

Take as many virgins as you please and incise the skin of the perineum to the sphincter and no evil results will come from it.

Recently dermatologists have taken up that work. Surgeons had gone to the deeper structures, but now have taken up skin surgery anew. The flap-splitting method, whether it is carried to the urethra or not, is the same procedure. The sphincter is torn and sutured. Dr. Wathen does one flap-splitting method, and after he completes it he adds sutures to unite the sphincter. I hold that many of the operations that have been described are failures. The sphincter in such cases is never united, and the woman continues to suffer from incontinence of feces and gases.

Dr. Johnstone called attention to the buried animal suture. I think he should correct himself in regard to this suture. When the ends are left long and out, they are not buried, and they are a source of irritation and pain to the patient while in bed. An irritating, angry patch of granulations is left about the suture that gives pain to the patient throughout convalescence.

The Emmet operation begins inside of the pelvic floor. Just here I wish to call attention to an important point. Let us go back to the primary tear. When you get a laceration you simply throw bed-clothing over your patient. Never do that if you have had a primary laceration of the perineum. It is folly to cover these patients up with bedclothing. If there is a round needle in the house you can close it up and leave the woman sound and in a healthy condition. You have no right to neglect a primary tear. It is just as important that you stitch it up as that you tie a bleeding vessel at some other point of the body that has been incised. If this tear is not repaired she may remain in a measure incapacitated for domestic duties and marital relations. The suffering in some of these cases you can scarcely calculate.

It is a common thing to find a deep-seated tear on one side of the pelvic floor and perineum. It is most common and deepest on the left side. The tear on the right side will be a short one. What do you do? Would you put in three skin perineal sutures? Surely not. You would treat the wound as you would a wound in any other part of the body. You surely would not take a deep-seated tear on the left side four inches in length and attempt to bring this point to that [illustrating] by three superficial sutures of the skin. It is contrary to the surgical principles of suturing. You would begin inside and pass the sutures deeply at the apex of the tear far into the tissues, pass then to the bottom of the tear and back on the other side, and then tie them all the

way down, including the tissue, lacerated fascias and muscles, and bring the torn surfaces into perfect apposition throughout the tear, and you will have the same union you would have in any lacerated or incised wound on the body, applying the same principle.

It is perfectly barbarous to use this big needle. Baker Brown and others have lost cases from tetanus from the use of this big needle, and I am surprised that more patients do not die. It should be thrown into the sewer.

After the perineum is closed, if you put your finger over the skin perineum it will come down to the anus and you still have a rectocele above it. Pass your finger into the bowel and you have the mucous membrane of the bowel and vagina between two fingers. Ask a woman to strain and the rectocele will roll out over the perineum. When she turns on her side, air bubbles through her vagina. Ask these women, when constipated, whether they have any sensation of defecation through the vagina, and many of them will tell you they have. Surely, gentlemen, you would not call these good results. Yet, if you study the subject carefully, such will be your experience. You may just as well put tight drawers on your patients, or sew up open ones, as do these skin operations, for all the benefit derived.

Again, with reference to the flap-splitting method and the removal of cicatricial tissue. You run your scissors up to the crest of the rectocele and the other side, and very often you split structures that have never been torn. If you compare this operation with a hernia operation, I do not think you would apply such a principle of suturing. It does not make much difference whether you use skin in herniotomy or not; you are dealing with the same structure, and you are applying the same principle.

You may suture the peritoneum and fascia the entire thickness of the abdomen in a hernia operation if you want to, and get perfect apposition of the structures involved. The loss of a little scar tissue is never missed. The hypodermic is used freely in some of these cases. I have known many of these operations in which morphine was used by mouth and suppositories of opium introduced into the bowel. I am surprised that some of these patients got well.

The Emmet operation, by freshening the deep sulci and passing sutures deeply, bringing the pelvic floor from the cervix forward,

is, to me, the most perfect operation I have ever practised. I want to say here that I have practised all the different methods to determine the very best procedure as yet advanced. After visiting Dr. Emmet—he having kindly demonstrated his last operation to me—I have been practising it for some time. He afterward did the operation in Philadelphia in the presence of my friends, and the conclusion was reached that the old operation for torn sphincter and other injuries of the pelvic floor gives the best results. The suturing is difficult. Unless you can use scissors and tenaculum and needle-holder, you had better not practise it. There is little or no pain from it.

Dr. Hadra.—I fear Dr. Price did not understand what I meant. I want the splitting to extend higher up, so as to meet the levator muscles. I think the operation is based on sound principles. It is, of course, not only skin and mucous membrane that has to be lifted up. In Tait's operation, as well as in any other, the muscles have to be laid bare and have to be united. It is true that the anterior aspect of them may be brought together more than is physiologically the case, but practice proves this rather to enhance than to lessen the result. I am well pleased with Tait's device.

Dr. George J. Engelmann, of St. Louis.—I was in hopes of hearing some of the opinions of the members of this Society on Dr. Johnstone's practical and interesting paper, because the subject of perineorrhaphy, whilst it is by no means as attractive as some other subjects which have been discussed, is one of far greater importance to the mass of practitioners. If you will recall the results obtained as the operation is generally performed, I am sure you will agree with me in the desire to have more light thrown upon this subject.

Dr. Johnstone gives us Tait's operation with an improvement added. That peculiar operation introduced by Mr. Tait is, in my opinion, adapted to the perineum proper, and for a comparatively recent tear, where relaxation of the vaginal tissues and descensus have not yet followed. That has been my objection to it. It is one based rather upon theory than upon practice, as I have never resorted to the flap-splitting operation. I have been satisfied with some of the older methods, and I see no reason for making a change.

For a great many years I have held that operations upon the

perineum alone are almost useless. We operate either at the moment when the injury occurs—immediately after delivery—and then, of course, we unite as nature indicates in the ordinary way; or we are, as a rule, called upon to operate after years, when we have not alone the original perineal injury, but its sequence to rectify. What are the conditions which we find? A rupture of the perineum, generally a laceration of the cervix, enlargement of the uterus, the coming down of the enlarged uterus, the relaxation of the tissues, especially relaxation of the vagina, finally cystocele or rectocele more or less expressed. We have not a simple laceration of the perineum to deal with, but we have its sequence to meet as well, because patients do not come to us until this sequence appears, which in some instances means years after the injury, and they come, not so much for the laceration of the perineum itself as for the sequence which it has produced. I do not think that Tait's operation—or rather the flap-splitting operation—which merely repairs the perineum, is sufficient in the great mass of cases. I have for the last twelve years never performed a simple perineorrhaphy, but have invariably gone well up into the vagina, as far as it was necessary, to contract and give support to the uterus, and have employed the ordinary methods, mainly fashioned after Hegar's, but varied with the individual case. It is very easy to run up a triangle into the vagina; you may extend it to the cervix and thus narrow the posterior wall as much as it is necessary, together with the simplest of the old perineal methods. We can readily combine more or less a narrowing of the vagina with any one of them, and I believe that this is necessary and desirable in the great mass of cases. We see a great many perineal operations which seem to have united satisfactorily; I mean perineal operations as they are ordinarily performed—purely perineal—which seem to have united nicely, but they present nothing but a skin perineum —a superficial closing—from the outside. It appears as though the parts were solidly united, but as soon as the finger is passed it runs down into a deep pouch behind this flimsy perineum. This is the case when the old method is imperfectly performed, and I presume that unless the splitting operation is thoroughly and carefully done similar results will be obtained. I certainly prefer a method which enables me, at the same time, to repair

the vaginal injury and to overcome the injurious results which have followed.

Dr. John Brownrigg, of Columbus, Miss.—I would like to inquire of Dr. Engelmann if he has ever had cases come to him in which there were involuntary discharges within a year after the laceration of the anus.

Dr. Engelmann.—That is true where we have a laceration or other injury of the sphincter, but I understood that the method of Dr. Johnstone was in the main for the repair of the ordinary perineal injury, and not for the complete laceration with involvement of the sphincter.

Dr. Brownrigg.—I would like to state that for the last eighteen years I have invariably operated immediately after laceration of the perineum. The first time I did the operation was eighteen years ago, and I have continued it ever since. I used then ordinary silk for sutures, and since I have used silver wire, pulling it through as Emmet does. I use Emmet's needles and carry them with me when I deliver a woman for the first time. If there be a laceration I at once close it up. I pass a straight ordinary No. 1 sewing needle through the flesh, entirely concealing the silk or silver wire. I use silver wire now almost exclusively. I arm this needle with a double ligature—that is, I make a loop of the silver wire as practised by Emmet—I then tie a finger-knot into the wire loop and pull the silver wire through, putting in three or four deep sutures, as the case may be. I secure the entire line of laceration in the vagina down to the lower margin with carbolized catgut sutures. I use superficial intermediate sutures to keep the margin of the perineum applied. I do not care what plan you use to secure the laceration of the skin; unless you use superficial intermediate sutures between the deep sutures or the continued sutures, union will be retarded by inversion of the margins of the skin. It is important to get that portion which is within the vagina united. Very often there is laceration when there is no external tear, and in such cases it is important to go up to the upper end of the laceration to put in sutures to close the margins to keep the edges of the laceration closely applied.

I secure the deep sutures by passing them through perforated bars, and fasten the end to the bars with perforated shot; then when swelling comes on the bars will separate, and the edges of

the skin, secured by intermediate superficial sutures, will not become inverted. See *Pennsylvania Hospital Reports*, vol. i.

Dr. I. S. Stone, of Lincoln, Va.—It would appear to me that the subject of immediate repair of the perineum should be so well established as to lead to no discussion here. I believe that if every general practitioner would immediately restore the tear within the vagina that there would be little or no necessity for further operation than that known by the name of Mr. Tait. I would say further, that the simplicity of the operation commends itself very much, indeed. For instance, I will wager that if we take a class of one hundred students, and let them witness the operation done by Emmet, there will be very few of them, indeed, who will be capable of performing it when they go to practise. Again, I would say, let the same class witness the performance of Mr. Tait's operation once, and they would be able to perform it immediately after going to their own cases. Since learning Tait's method in London in 1887–88, I have had three cases of torn sphincter, and invariably I have had union by first intention. I do not care whether there was a dimple on one side or the other. My results have been excellent.

Dr. R. M. Cunningham, of Pratt Mines, Ala.—I would like to make a few remarks on this subject of lacerations of the perineum. I notice that in the *Atlanta Medical and Surgical Journal* for November an author states that twenty per cent. of women have their perineums torn during first labors, and four per cent. in subsequent labors. According to my observation, I believe that from sixty to eighty per cent. of women who have borne children have more or less laceration of the perineum.

I want to say here that a man who never has a lacerated perineum in his practice, in my opinion, never has any obstetric cases. Therefore, I believe that more or less lacerated perinea are very generally universal in obstetric practice.

Now, the question arises, what becomes of the hundreds of women who have torn perinea from the commissure down to the sphincter in whom no operation is performed? Do they die? Are they invalids? Are they permanently diseased? Do they have rectocele or cystocele? Do they become sterile? My observation is that the vast majority of lacerated perinea of the first or second degree of authors do no harm; but, on the contrary, facilitate subsequent labors.

Perhaps it is very unscientific for an ambitious man to make these statements, but it is simply in the interest of truth that I have made them. Now, to say that a lacerated perineum always does no harm would be as ridiculous as to say that the cause of pelvic inflammation is always inside of the tube, or that every tumor in the abdomen is ovarian. When the perineum is torn through the sphincter, as a matter of course, an operation should be performed. I do Emmet's operation. In my opinion it does not matter so much what operation you perform, as to have in view a specific object, and that object is to repair anatomically the perineum. In the operations in which I have failed to denude the little depression which Dr. Price spoke of yesterday, I find that after the operation is completed, if I insert my finger in the rectum it does not take hold of it. Where I denude the little depressions and insert my sutures deep and almost close up the anus, after recovery takes place, if I insert my finger it takes hold of it with a vim. For that reason I believe the restoration of the sphincter is accomplished by Emmet's operation. I do believe, where patients present themselves at our offices, if we make examinations we will find in the majority of cases the perineum torn down to or nearly to the sphincter. We will find in most of these cases that there is no prolapse of the vagina or bladder, or of the uterus, but in some cases merely a catarrhal trouble or something of the kind, causing the symptoms. I do not believe it is good surgery to sew up every one of these perineal rents on the hypothesis that they are the cause of the trouble, if any, and particularly if a woman has comparatively good health with a prospect of having more children. In other words, the operation should not be performed solely because of the rent being present, but only in those cases where from the loss of the mechanical function of the perineum, secondary results—rectocele, vesicocele, uterine displacements, nerve-reflexes, etc.—follow in consequence.

Dr. W. L. Robinson, of Danville, Va.—I cannot permit some of the statements that have been made to pass without entering my protest. There are several reasons why we should operate immediately. In the first place, we should operate to avoid danger of septicæmia. I can conceive, sir, of only one condition of things really which precludes the idea of repairing the perineum when lacerated, and that is, in cases where we find some-

times a bruised and pulpified condition of the parts—a condition in which the stitches will inevitably cut through, leaving the skin intact and a pus sac. In all other conditions I see no reason why we should wait and leave denuded surfaces for the secretions of the womb to pass over and be absorbed.

Dr. Virgil O. Hardon, of Atlanta, Ga.—I do not think it would be difficult to answer Dr. Cunningham's question with regard to the large number of women that suffer from laceration of the perineum. Gynecologists, if no one else, can answer that question. They are coming to us constantly suffering from various symptoms which result from this condition—symptoms with which you are all familiar. Besides local symptoms, rectocele, cystocele, prolapse of the uterus, and the like, which we find in these cases, there are reflex symptoms through the nervous system from which these women suffer. Now, we know that in laceration of the cervix, where there is often only a slight tear, which has almost completely healed under the influence of nature's *vis medicatrix*, the presence of cicatricial tissue in the angles of the laceration will be sufficient to account for reflex nervous symptoms. We know that the removal of such cicatricial tissue causes disappearance of these symptoms.

I have been impressed with the fact that we have these same reflex symptoms occurring from the irritating presence of cicatricial tissue in the perineum. I remember a case which I saw in Atlanta about two years ago of a young married woman, who in her first labor had suffered not from the usual rent of the perineum in the median line, but from a transverse tear through the mucous membrane and the subjacent tissues just above the posterior commissure and within the vagina, which healed, leaving a linear cicatrix probably about the sixteenth of an inch wide, extending transversely across the posterior vaginal wall. In the course of three or four months this patient began to suffer from various reflex nervous symptoms from which she had not previously suffered. The perineum was examined and there was no appearance of a laceration; but within the vagina there was a linear cicatrix, and the parts were tender, so that coition was painful to her. I removed the cacatrix, bringing the edges together, and secured primary union. With the removal of it there was complete disappearance of all the reflex nervous symp-

toms from which she had suffered since labor, and there has been no recurrence of them up to the present time.

The removal of the cicatricial tissue I conceive to be one of the advantages of the operation by denudation, a point that was touched upon in the discussions yesterday. In Tait's operation we do not get rid of any cicatricial tissue. While ordinarily in the majority of cases such tissue may not be in sufficient amount, or so press upon the terminal filaments of the nerves as to produce reflex symptoms, yet I am satisfied from my own observation that we do sometimes get reflex symptoms from its presence.

Dr. Wathen.—I would like to say a few words about Dr. Hardon's remarks relating to cicatricial tissue, and the good results in such cases claimed by Emmet's operation. By the splitting method you bring together the ends of the torn sphincter ani and other muscles, and the torn fascia. I have never experienced in the splitting operation (though I have done it many times) any of the difficulties that have been pictured to us consequent upon cicatricial tissue. Cicatricial tissue is the result of the efforts of nature by granular process to repair the injury. If this tissue is very deep and you attempt to denude it all away, you will remove an amount of tissue from the perineum that might result in a very annoying condition. By splitting you go beneath the cicatricial tissue, divide the recto-vaginal septum, and extend the separation up the recto-vaginal wall to a distance that when brought together restores the perineum as near as possible to the condition existing before the rupture. You can then bring together surfaces that are not cicatricial, the cicatricial tissue being on the anterior surface of the vaginal flap. The splitting process and the union of these cut surfaces promote a healthful involution, as it were, or absorption of the cicatricial tissue, and is one of the best ways to remove it—much better, I dare say, than an effort to remove it by its total destruction. I do not think that the presence of cicatricial tissue should influence us to adopt the denudation method, but it is one of the especial reasons why we should practise the deep-splitting process.

In regard to bringing together the ends of the muscles and the ends of the fascia by denudation—Emmet's process, as it is called —it amounts to this: he has taught us the important lesson of the necessity of getting union of the sphincter muscle better than anyone else. That is all. With that his teaching ends. When

you split up the perineum you split the recto-vaginal septum as far as you please. On each side you cut into tissues that have been torn; you can expose the fascia and ends of the muscles better than by any other process. When you bring the surfaces together, using whatever sutures you may deem best—the buried kangaroo, or chromicized catgut suture, with Emmet's deep perineal wire suture under the ends of the sphincter ani muscle —you get better results than you possibly could by denudation.

I am surprised to hear that so many operators do not get union of the sphincter ani muscle by bringing the edges together after the manner suggested: the surgeon who does not get union does not know how to operate on the perineum.

Dr. G. Frank Lydston, of Chicago.—Our eloquent friend, Dr. Cunningham, made some statements that seem to go unchallenged in regard to the frequency of rupture of the perineum. He stated that in his experience from 60 to 80 per cent. of ruptures of the perineum occurred during first labors.

In quite a considerable experience in the New York Maternity Hospital nine or ten years ago, I had opportunities to observe the relative frequency of rupture of the perineum in hospital practice. The house staff were all ambitious fellows and anxious to do operations; but for all that we never could find more than about 15 or 20 per cent. of ruptures of the perineum to repair. I do not believe the proportion of ruptures which require operation exceeded more than 10 to 15 per cent. The cases of rupture of the fourchette, which so frequently occurred, we could hardly dignify as ruptures of the perineum, because they healed without operation.

As regards the indications for the primary operation, we should consider that whenever the perineum is ruptured in the second degree, or whenever the perineal tissues are involved to any great extent an operation is called for—not only because of the benefits to be derived from the operation in the way of preventing uterine prolapse, etc., but because we render the field less liable to septic infection. In the hospital we operated on the major degree of laceration—that is, where the recto-vaginal septum was involved —and we did the primary operation, but my recollection is that we very seldom had successful results. Those who have successful results from the primary operation in severe degrees of laceration of the perineum are to be congratulated.

I did not hear the paper of Dr. Johnstone, but if he did not do so, I wish to call the attention of the Association to a point laid down by Thomas, of New York, with regard to the results of rupture of the perineum where the integument and mucous membrane are not involved. It is possible for the muscular and cellular structures of the perineum to be implicated and still the mucous membrane and skin be left intact. These are the foundation of cases of prolapse of the uterus, bladder, etc. Thomas insists, and I think justly, that these cases require operation quite as much as do those in which the external tissues are involved.

Dr. Cunningham.—Dr. Lydston said that the large percentage of torn perinea that I gave must be due to either unusually large heads of the children or unusually small outlets in the mothers in my county. I do not think that either exists. But in my opinion there is a difference in the percentage of ruptures of the perineum, not determined by section, but by the practice of the physicians of a community in the use or non-use of chloroform in labor. There is a great prejudice among the "old women" in the county against the use of chloroform. Doctors in many instances, either in deference to this prejudice or from choice, do not use chloroform in natural labors. I know many good, safe, and scientific men who do not use it as a rule.

Dr. Johnstone.—I am gratified at the free discussion that my paper has elicited, and the only reason for bringing the subject forward was very much like that of the oculist when working at the diseases of the eye. Just in proportion as he is successful in treating conjunctival diseases his reputation widens. He becomes more known. The same thing may be said of gynecology or the gynecologist; just in proportion as he is successful in repairing lacerations of the perineum after labor, so will his reputation be gradually made. These lacerations form the bulk of our work. It is nothing near as striking as abdominal surgery, but we have had so much of that of late that I am afraid some one will ring a chestnut-bell on me when I speak about it. My reason for bringing the subject of perineorrhaphy forward was (not that there is anything original in what I have done) simply to show that the thing I thought was possible has been proven, and for the last three years I have been closing tears which produce rectocele, which bring on reflex symptoms caused by damage to the pelvic

floor, by the use of Mr. Tait's method applied to principles worked out by Emmet and other men.

After all, gentlemen, the closure of the perineum is like the locomotive—no man invented it. Each one adds his quota to it. It is the work of generations. It is a step further in the right direction. There is nothing new about it, as Dr. Hadra has said. It has been suggested, and improved, and I meant to show that it has been put to a practical test and that it does stand the wear of time.

There have been so many points raised that I fear it will be impossible for me to touch upon all of them. Many of them have been answered to my satisfaction by the debaters that have preceded me, but there are one or two I would like to speak of. Dr. Hadra spoke yesterday in regard to injuries being behind the rectum. A great many of them are. Some are lateral; some in that portion of the diaphragm where the vagina passes through which are to be reached by the deep splitting of the recto-vaginal septum and the cellular tissue lying on either side. You can get hold of some of these tears and bring them together, which give an artificial support. It is a natural support as far as placing the organs in their original position is concerned.

One thing more: It is an unfair way in which Dr. Price yesterday treated Mr. Tait's operation. I wish he was here to listen to what I have to say about it. He has come here and elsewhere with the same old speech time and again, showing that he does not understand Tait's operation.

Now, with reference to the needle that Mr. Tait uses, and the remarks that Dr. Price made about it yesterday, I make this point, that when Mr. Tait's needle for the perineum "goes into the sewer," Dr. Price's needle for the abdomen ought to go with it. There is very little difference in the size of the two. The idea of the needle producing tetanus is no argument whatever. I would like to ask, Is not anything else just as liable to produce tetanus? We know what tetanus does; it is a great bugbear to us, and yet Dr. Price would have us discard the needle. I do not care, gentlemen, what sort of needle is used if the stitches are put in properly.

PUS IN THE PELVIS, AND HOW TO DEAL WITH IT.

By Joseph Price, M.D.,
Philadelphia.

It is remarkable, in view of accurate pathological and anatomical researches of such men as Bernutz and Goupil, made over twenty years ago, that the profession should remain to this day burdened with the unscientific and erroneous ideas of pelvic troubles which sprung from ignorance and are perpetuated by conservatism. Pick up to-day almost any alleged authority on gynecology, and you will find pelvic troubles gravely discussed under such headings as perimetritis and parametritis, pelvic abscess, and the like, with lengthy disquisitions as to the pathological changes, supposititious causes for the conditions, and the varieties of treatment indicated in each.

Such discussions are of value only as curiosities, and are of more service to the progressive physician as kindling than as a guide to relieve his suffering patients.

Briefly stated, perimetritis is defined as an inflammation of the peritoneal covering of the uterus and its appendages; a comparatively rare condition, frequently fatal. Parametritis is an inflammation of the cellular tissue of the broad ligament, a common condition, often ending in abscess, and rarely fatal; while pelvic abscess means pus in the pelvis. Such were the old ideas; the new faith believes them to be essentially salpingitis—inflammation of the tubes and ovaries being the cause primarily of all these troubles.

In this brief paper I shall confine myself to the subject of

pus in the pelvis, and I speak entirely from my own experience, which is not small. Right here I wish to say that I do not deny that the condition known as parametritis may possibly occur. Inflammation of the cellular tissue and formation of pus can occur anywhere in the body where there is cellular tissue, from the scalp to the sole of the foot. But I have never seen it in the pelvis independent of tubal trouble. If it ever does so occur it must be the result of traumatism, and I cannot see how it would fail to involve the surrounding structures. It is a very rare condition of itself. That it occurs in connection with, and consequent to, tubal and ovarian trouble I have frequently seen and demonstrated by operation, but even here it is the exception and not the rule.

Pus in the pelvis is a broad subject, and I accept it in order to narrow it to proper limits. By pus in the pelvis I mean pus that has its *fons et origo* in the pelvic organs or their investment. The rarer causes of pus in the pelvis may be said to be: (*a*) carious bone, as psoas abscess; (*b*) traumatism, as sloughing results of electricity, direct violence, etc.; (*c*) foreign bodies, as extra-uterine bones, etc. But the general rule is only established by such exceptions, and the general rule is that pus in the pelvis is always the result of a diseased condition of the uterine appendages, whether it occurs as a result of a ruptured extra-uterine pregnancy, a suppurating ovarian or dermoid cyst, or salpingitis caused by gonorrhœa, parturition, injury to small tumors, dirty instruments, electricity, or what not. In general, then, when you have pus in the pelvis you will find its origin in the uterine appendages. I have seen pus discharging from the rectum, from the bladder, from the umbilicus, from the vagina; I have seen psoas abscess, perforating appendicitis, idiopathic peritonitis, and "typhoid fever," and found the seat of trouble in the tubes and ovaries. In all my experience I have never seen pus in the pelvis independent of the appendages. It may perhaps occur, but it is strange that I should not meet with it. Of course, the pus cases I see answer the description given of para- and perimetritis as far as subjective or objective signs are concerned.

Pus in the pelvis is very rarely a simple single abscess, and this fact has most important bearing in the treatment. From the anatomical relations of the organs the complexity is easily understood. Peritoneal inflammations and adhesions are always present. The tubes are frequently divided into pus-pockets, separate from each other and from other collections of pus, as pus-pockets in the ovary or in the cellular tissue. The condition very frequently occurs on both sides of the uterus at the same time. To make the statement definite, I have seen more than once double pyosalpinx and double ovarian abscess contained in a pus-pocket in the peritoneal cavity composed of adherent intestines and inflammatory tissue, four abscess cavities contained within a fifth. Again, I have seen a single pus-tube with four distinct pus-pockets in it. Again, pus can burrow through the cellular tissue and find vent as I have stated above, entirely misleading a careless observer as to the true condition of affairs.

I have intentionally omitted reference to analogous pelvic conditions, and it is not my purpose to discuss the diagnosis. The diagnosis is easy in typical cases, the symptoms are marked, and pelvic examinations establish the existence of the lesion. In acute cases, the treatment for any condition simulating it would be the same. In chronic cases the errors of diagnosis are most frequent, the septic condition of the system is generally marked. Typhoid, in fact, as I have stated, chronic purulent pelvic disease, has been more than once mistaken for typhoid fever, and in three cases within my personal knowledge was treated as such for over three months by an alleged specialist in diseases of women. Beware of atypical typhoid fever in women. I have seen it called psoas abscess, but in general it has been called suppurating parametritis or plain pelvic abscess.

How shall pus in the pelvis be treated?

The general principles of surgery for the treatment of pus in any other part of the body apply with equal force to the pelvis: namely, where pus is present, evacuate it; and, secondly, remove the cause of the suppurative process.

It is equally unsurgical and unscientific to allow pus to remain in the pelvis, as it would be to allow it to remain in the brain, in the mammary gland, or under the fasciæ in any part of the body. It is equally unsurgical to allow a suppurating tube or ovary to remain in the pelvis, as it would be to allow a sequestrum of dead bone to remain or to permit a necrotic placenta or membranes to be retained in the uterus. These principles do not admit of evasion.

All sorts and kinds of treatment have been tried without avail. Every man of experience knows the futility of counter-irritation, local depletions, or a general systemic treatment in the vast majority of these cases.

There are only three methods of treatment common to physicians to-day, namely, electricity, vaginal drainage, and abdominal section with the removal of the diseased parts, thorough irrigation of the peritoneal cavity and drainage.

The first of these methods need scarcely be mentioned in cases where pus is already present; no good is claimed for it here. But if, perchance, the enthusiastic electrician has not recognized the presence of thickening in the cellular tissue, he can dissipate the conditions like dew before a hot sun. The folly of electrical treatment needs no further exposition than the advice of one of its most celebrated advocates, namely, to convert an acute inflammatory condition into a subacute, and then chronic stage, by gentle persuasive currents; and, when it has reached the chronic condition, to dissolve it by the strongest currents. When we remember that adhesions are often much stronger than the normal tissues that they bind together, the dissolving value of electricity sinks out of contemplation. Electricity has no place in the treatment of pus in the pelvis. With regard to vaginal drainage, it is a crude, inefficient method, and not so safe as some would have us believe.

Were pus in the pelvis, always or even generally, in a single abscess cavity, the method might be rational and effective; but at its best it would be a poor substitute for abdominal section. In abdominal section we have the quickest, easiest, most

exact, and, therefore, safest mode of treatment for pus in the pelvis.

A small incision, rapid enucleation of the offending tubes and ovaries, the breaking up and evacuation of the separate pus-pockets, the separation of adhesions, the thorough washing out of the peritoneal cavity by copious irrigations of warm distilled water, the placing of a glass drainage-tube in the most depending portion of the peritoneal cavity, and the careful closure of the abdominal incision, give the patient the quickest relief, permanent cure, and very often snatch her from an impending death. Moreover, here we attain the most ideal treatment, for at no other point of the body can we enucleate completely an abscess with its containing walls and pyogenic membrane. However, we should always bear in mind that the province of the surgeon is, first to save life, then to relieve suffering, rather than to perform ideal operations. Many patients dying with pus in the pelvis need but a feather's weight to depress the beam.

In such cases the indications are: to evacuate the pus, wash out the cavity, and wait until a future time to remove the offending cause.

DISCUSSION.

Dr. Virgil O. Hardon, of Atlanta, Ga.—Mr. President, this morning I advocated a method of procedure which should accomplish just what Dr. Price has been preaching—that is, to put the patient in a condition when an ideal operation might be done. If a patient is at the height of an acute peritonitis she is not in a favorable condition for laparotomy. If she is suffering from a temperature of 103° to 105°, with a pulse up to the point of which Dr. Price speaks, which cannot be counted at the wrist, he advocates subduing the inflammation by gentle means. I am glad he has changed his opinion since morning.

Dr. George J. Engelmann, of St. Louis.—I cannot permit the sweeping remarks of Dr. Price about the use of electricity to pass without some corrections. It is a subject that is by no means settled as yet, but, notwithstanding the numerous condi-

tions for which electricity has been applied, I am not aware that any one has suggested its use in suppurative troubles, unless it was simply for the sake of making an opening by the cauterizing properties of the metallic pole, then distending with the dilator, and draining large accumulations of pus. By making an opening with the negative pole of the battery you avoid hemorrhage, and you have a non-contracting opening through which you can at once pass a drainage-tube. That is the only purpose for which electricity has been used in suppurative conditions, unless it is the secondary one of causing absorption of the thickened walls after evacuation of pus. I do not think any one would attempt to use it for the purpose of replacing surgical interference in abscesses already formed. We cannot compare a surgical operation with the use of electricity, as Dr. Price seems to, because the two methods do not answer in the same condition. Each one has its proper sphere, and answers a definite purpose.

Dr. Price spoke of some one—I do not know to whom he refers—who favors the use of electricity in reducing exudates in the pelvis, and he appears to me to have spoken of such a procedure as a ridiculous one. Whether or no I have understood him correctly, I will say that there is no means of doing this as rapidly and positively as by electricity. The electric current will not only bring about the absorption of an exudate, whether in the pelvis or any other part of the body, but the absorption of scar-tissue as well, and of cicatricial growths, which recur when cut out with a knife. The results achieved by the proper use of electricity on solid exudates are marvellous, but it would be a mistake to use electricity if pus has formed to any extent.

I am confident that every member of this Association heartily endorses the statements made by Dr. Price, that wherever pus forms we should remove it,—remove it early and thoroughly. It is a pleasure to hear a sound doctrine well enunciated, and Dr. Price has well demonstrated a sound surgical doctrine which is accepted, and has, I hope, been practised by all of us in other fields; it has certainly been accepted in theory, but I fear not carried out in cases of purulent accumulations in the pelvis, and great credit is due Dr. Price for doing in the pelvis what every student of medicine knows to be right in any other locality. Dr. Price has taught us to do in cases of pelvic abscess what we do with every other abscess, and by his success he has proven that

it is the correct course, and can be successfully adopted by the skilled aseptic surgeon. We know this to be the correct course, and yet but very few have dared follow it, and these few, like Dr. Price himself, have only ventured to carry out this fundamental surgical rule since aseptic surgery has fully developed. That an abscess should be emptied when pus has formed, and that a bleeding vessel must be tied, are equally simple, fundamental, and well-known rules of surgery; yet, the best operators in this advanced eighth decade of this progressive nineteenth century have stood by the bedside, with folded hands, and have seen life slowly ebbing away through an open vessel, until Lawson Tait taught us that we must cut down and ligate a bleeding vessel in the ruptured sac of an ectopic gestation precisely as we would if it were in the arm or leg. Strange as it may seem, able surgeons failed in their own practice to carry out the A B C of surgery, which every graduate, every student of medicine is familiar with, until Tait taught us to tie the bleeding vessel in the pelvis as we would tie it elsewhere, until others equally far-sighted taught us that an abscess in the pelvis must be emptied and cleansed like an abscess in any other part of the body.

To Dr. Price we are indebted for his clear and forcible elucidation of the subject and for the substantial proof he has given of the correctness of his method of dealing with pus in the pelvis by his brilliant success.

Dr. I. S. Stone, of Lincoln, Va.—I am pleased with the remarks of Dr. Price, and I think we have had one of the most interesting series of discussions which I have ever participated in or heard. Although I have been benefited by what I have heard, yet I feel I speak the minds of many present when I say the case is not decided as yet as to what these hard masses in the pelvis are. We find them with a high temperature, especially following abortions, and occasionally following natural delivery. It occurred in my practice, in the last year, to see perhaps a half-dozen of these cases. I have found hard masses not unlike fibroid tumors. I have read Tait's book on *Ectopic Gestation*, and he says, very pertinently, that many of these masses in the broad ligament are extra-peritoneal, and an examination will hardly reveal just what they are. Again, in Dr. Playfair's paper, read before the British Medical Association at its last session, the eminent author claims to have dissipated such a mass by means of

the electric current. Mr. Tait declared that the exudate in Playfair's case was *blood in the broad ligament*, and that it would have been absorbed without the help of electricity.

With regard to operative interference. If we offer to do an operation in some of these cases it will certainly be rejected, so that it is of great importance to the general practitioner to know what to do in such cases. If they are not prepared to operate, they may select some specialist to do so.

I repeat, that I have had such cases in my practice, and I want to know what we are to do in case operation is refused. I am aware that some of them get well enough to satisfy themselves, and well enough to do work, and have more children.

Dr. W. L. Robinson, of Danville, Va.—I hold pretty much the same theories as those that have been advanced by Dr. Stone. I have been interested in the discussions, and have had some experience in the matter of pus-cavities. I have been impressed with the fact of the tolerance of the system to these accumulations of pus. How are we to decide between those cases which are simply inflammatory, and, treated, get well, and those which require an operation for the removal of the pus-tube or tubes.

I recall to mind a case that has been under observation for four or five years. Every three or four months pus is seen discharging through the rectum high up. The patient is seized with a severe pain, high temperature, and a rupture of the sac through the rectum relieves it temporarily. When this patient came under my care for the first time, she gave me a history something like this: She had not had a movement of the bowels for ten days. She was in fairly good health. She had tried every means to procure an evacuation both by purgatives and enema. I performed laparotomy. I found the whole pelvis filled with pus, and adhesions in every direction. I broke them up, washed out the cavity with an antiseptic solution, and in three weeks the patient was well. She has had no recurrent attacks, and no pus-tubes since. Again, I ask, how are we to decide between those cases which can be cured by medical treatment and those in which we do a surgical operation?

Dr. B. E. Hadra, of Galveston.—There is no question that there are cellulitic abscesses. I suppose you are all familiar with Thomas's operation of lifting up the vaginal cover of the cervix in order to get into the paracervical cellular tissue and empty

abscesses there. It clearly demonstrates the extra-peritoneal location. I have operated several times for cellulitic abscesses, approaching them by an incision over Poupart's ligament, like that for posas abscesses. Also phlegmonous abscesses following injuries to the cervix; those—for instance, after caustic applications—are mostly extra-peritoneal. Therefore, I do not subscribe to the theory that all and every pelvic abscess is intra-peritoneal, though I concede that clinical evidence proves them to be more frequent than presumed. I think that, for diagnostic purposes, traction of the cervix by a tenaculum is of value. If the tumor is cellulitic, it will come down with the cervix, being mostly attached to the latter. If it is intra-peritoneal, it will very likely be in connection with tubes or ovaries. It will thus become more distant, because the named organs make, as a rule, an upward lever movement when the womb is pulled downward.

A very excellent article on the differences between cellulitic and intra-peritoneal abscesses appeared some years ago in the *American Journal of Obstetrics*, written by Mundé.

Now, in such exra-peritoneal abscesses there is certainly no need for laparotomy. Besides, I do not agree with Dr. Price that pus in the pelvic cavity is, under all circumstances, due to tubal affections. How is it in men? It is true that the tubes offer the only entrance into the female peritoneal sac, but under morbid conditions the infection may come from and through the walls of the bowels, the gall-bladder, liver, the kidneys—in short, from any defective or diseased intra-peritoneal organ.

Dr. W. W. Potter, of Buffalo, N. Y.—At this late hour I hesitate to enter into a discussion of this interesting subject, but I may seize upon this last moment before recess for the purpose of alluding to one or two collateral points.

"Pus in the pelvis and how to deal with it." If the discussion were limited to that question alone there could be but one answer —one proper answer, viz., to handle it surgically. No person present will, I am sure, take exception to that.

It is, however, pertinent to consider the antecedent conditions that may lead to pus in the pelvis; at all events, this appears to me a legitimate inquiry in a discussion on the subject. I am sure the majority of observers to-day will admit that if there is pus in the pelvis it gets there through some medium of infection. I am equally sure that there are three principal sources of infec-

tion, viz.: 1, traumatism; 2, parturition, and 3, gonorrhœa. In other words, we have a traumatic, a parturient, and gonorrhœic source that are chiefest in the causation of pus in the pelvis.

After considerable experience, predicated upon the observance of many cases, I may asseverate that the uterine-sound has been a frequent medium of carrying an infection into the pelvic cavity that has resulted, in some instances, in the formation of pus. It has certainly led, oftentimes, to intra-pelvic inflammations that have been the sources of innumerable and multifarious woful conditions in women; and I am of the opinion that, unless it can be limited in its use to exceptional conditions in careful hands, the sooner the uterine-sound is banished from the gynecological armamentarium the better—better for woman, better for the art.

It has become routine practice with many men who aspire to gynecological fame, to introduce the sound into the uterus on each and every occasion when a woman presents herself for treatment, and it is this indiscriminate and unnecessary employment of the instrument that I desire particularly to condemn; for the sound, even when clean—aseptically clean—may do infinite harm through its faulty or careless manipulation. It may do violence to the delicate structures through ungentle use, which is bad; it may carry with it the germ that will set up a destructive inflammation, which is worse.

I have spoken of this matter on previous occasions in the presence of some of the gentlemen now in this audience, and they know my views precisely on the subject. After more mature observation and an enlarged experience I wish to confirm what I have stated many times before, that the uterine-sound is a source of infinite harm-doing to woman. I doubt not there are many who can and do use the instrument skilfully and harmlessly; I do not criticise it in their hands in exceptional cases, but I do inveigh against the indiscriminate and routine use of an instrument that is not needed for diagnostic purposes, much less for treatment, and which is one avowed source of producing pus in the pelvis, a condition that Dr. Price has so skilfully and effectually dealt with in his excellent and instructive paper.

Dr. Price.—Dr. Potter has condemned the sound. I have almost forgotten such an instrument is in use. There is no question that it has done great mischief.

Not long ago Emmet condemned the indiscriminate use of

trachelorrhaphy. The mortality ran up above that of ovariotomy to the extent of three or four percentum with prominent operators. The results at present are not as good as they should be. Some women are suffering more than they were before the operation.

If you refer to Pepper's *System of Medicine*, vol. iv., you will find some one closes the cervix in tubal disease. The operator in this case saw the woman was going to die, and saved life by removing a pus-tube. Some of the large pus tubes which have been passed around were removed from women who had their cervices closed. It is surprising, gentlemen, to hear of the large number of women that are suffering, although they are being treated by gynecologists for some aberration or other, and but few of them agree what it is. In some cases the ovaries are removed and the patients suffer as much after as before operation. Some patients have gone on the other side of the water to be operated upon and the operation has done a great deal of harm. The cases are badly selected. I do not wish the members of this Association to understand me as wholly condemning the operation, for I have seen good results from operations in properly selected cases.

Dr. Hardon does not understand the group of cases to which I refer—the desperate cases, and the open treatment or operation to save life purely. Concerning the treatment of the class he specifies, we do not agree. In acute pyosalpinx, or abscess of the ovary; in acute pelvic peritonitis, puerperal or due to leakage from an acutely inflamed tube, with an accumulation of fluid in the pelvis, section, removal of the offending cause, irrigation and drainage is the ideal treatment. This without regard to pulse or temperature. It is impossible to overlook the good results of prompt pelvic surgery in the class he refers to.

The "hard masses" or "solid exudates," mentioned by Dr. Stone, are small tumors, large pus tubes, ovarian abscesses, or dangerous inflammatory products, and should be removed promptly. Extra-peritoneal exudates are very rare.

"How are we to decide?" Dr. Robinson answers his own query in the case detailed. Surely the answer is satisfactory. I am sorry Dr. Hadra clings to his ancient pathology.

GYNECOLOGY IN ITS RELATIONS TO OBSTETRICS.

By W. L. Robinson, M.D.,
Danville, Va.

I am aware that surgeons and gynecologists, when established in their specialties, drop obstetrical work, but so closely allied are the two subjects that it is peculiarly practical in this age, when septicæmia and other dangers threaten the pregnant woman, and want of proper preparatory treatment renders necessary so varied gynecological work, that, whatsoever individual experience teaches us diminishes useless suffering and lessens mortality, should be brought before intelligent medical associations, either to eliminate error or augment truth into useful reality by discussion, criticism, and test.

I shall not tax your patience by quoting from authors, but briefly outline my own views on some points interesting at least to myself.

1st. I shall speak of the cervix uteri in its pathological condition predisposing to hemorrhage prior to labor, laceration, and septic absorption. I have sought in vain from medical works at my command for an explanation of the cause of ulceration of the cervix, non-specific, non-malignant, causing hemorrhage in two cases which came under my observation within the last twelve months. I say non-specific because of the perfect health of patients prior to pregnancy and since delivery, and my knowledge of and intimate acquaintance for years with husbands and wives.

The first case was seven months advanced, and spending summer in the mountains for the benefit of one of the chil-

dren. She found herself unwell after a walk, and the flow was sufficient to soil clothing and require napkins. A physician was called, who gave ergot and opium, which controlled it in twenty-four hours. Two weeks subsequently the conditions repeated themselves, and relief was obtained by the same remedies. She returned to the city, and again was annoyed by like hemorrhage, which came on about 7 P. M. daily, in spite of attending physicians and numerous remedies, until, on the sixth day, having reached home, and being her regular attendant, I was called. I examined with speculum, and found the os granular, denuded of its mucous coat, and upon gently opening the os with uterine dilators I discovered a small clot adherent to an ulcer which caused bleeding when removed. I applied carbolic acid to the ulcer, and dusted the os and vagina with boric acid. I continued treatment until the parts were in a healthy condition, and delivered the woman at full term without hemorrhage, tear, or any unusual sequelæ. No placenta prævia existed, and not one drop of blood escaped after the first application of carbolic acid until after delivery, and then everything was normal.

2d. The second case occurred a few weeks subsequently to the first, with so similar a history and result that it is useless to recite it. Both women have four children, perfectly healthy in every respect. I have for several years made it a habit to examine my regular patrons whenever a yellowish or dirty white vaginal discharge existed, especially if the vulva was irritated, and almost invariably find the os granulated, whether lacerated or not, and I persistently treat them until restored to a healthy condition, explaining fully to the patient the importance of such treatment. Should no such treatment be given with such pathological condition, laceration of the cervix is inevitable during delivery, and the situation inviting for septicæmia.

I insist, gentlemen, that you try the ounce of prevention.

Should, however, no treatment be allowed, and you have a lacerated cervix, shall it be repaired at once? If the womb be perfectly cleared, no attachment of placenta having existed

to retain shreds to decompose, and the rent is not stellated, repair at once, otherwise irrigate with antiseptics. Should the perineum be lacerated, however extensively, repair at once, unless the vagina is bruised and pulpy, for then your stitches will cut out, and, the skin not yielding, form a sac in the vagina for pus. Should septic fever supervene, from whatever cause following delivery, I hold that if proper intra-uterine irrigation and aseptic precautions be observed regarding lacerations, and no pelvic pains exist, no tenderness in moving uterus, and no deposits can be found by careful examination, laparotomy is irrational. *Per contra,* should tenderness indicate pus in the tubes, verified by a careful examination, laparotomy is the only resort.

Should fibroid tumors of the uterus justify surgical interference when complicating pregnancy?

Knowing the tendency to use the knife, I would say conservatively that I have had two cases in the last two years to go to full term heavily guarded with opiates, and the tumors disappeared to such an extent as not to annoy afterward.

In another case a double uterus existed with a common cervix, which was pronounced by two eminent gynecologists to be extra-uterine pregnancy and malignant growth. The fibroid was in the right uterus, and extended to the umbilicus at third month of pregnancy; she miscarried at four and a half months, and tumor had almost disappeared at my last examination, six months after.

Extra-uterine pregnancy is, indeed, difficult to diagnose, but should symptoms of pregnancy exist, with pain well located, examination revealing a growing tumor, and hemorrhage from the vagina, and I strongly suspect the true cause, I should operate, or, at least, would make an exploratory laparotomy. I would not use electricity, for fear of rupturing the sac. I strongly suspect that the reports of electricians would show vastly reduced figures if any means existed of proving faulty diagnoses.

Lastly, I wish to ask an explanation of a phenomenal con-

dition associated with laceration of the cervix. More than two years ago, while reading quietly in my office, three gentlemen called in the course of an hour, each inquiring why their wives had lost all sexual feeling, and on inquiry elicited the fact that the time that such condition existed dated from the birth of some one of the children. I obtained permission to examine, and found lacerated cervix in all three. I began to suspect at once that the lacerations had something to do with the insensibility, and sought thereafter to find out whenever I discovered a laceration if others were so influenced, and in the last two years I have found only one exception. I have been further confirmed in my views by the restoration of normal sensibility when successful union was secured by repairing cervix. I am aware that little or no sensibility exists in the cervix, but I suspect that reduction in the size of the uterus, and restored normal circulation to the pelvic organs, causing a cessation of pathological reflections, are cogent factors in the restoration of the normal function.

DISCUSSION.

Dr. Bedford Brown, of Alexandria, Va., in opening the discussion, said: I simply desire to corroborate the statement of Dr. Robinson made in this paper by the citation of a case, which I will do very briefly.

The patient had a bilateral laceration of the cervix. She became bitterly hostile to all sexual intercourse with her husband, and this thing preyed upon her mind to such an extent that she ultimately became insane, having an intense dislike of her husband's company and presence. I treated the case with applications of nitrate of silver, and the lacerations healed perfectly. All symptoms after that disappeared entirely. The woman regained her reason; she regained her affection for her husband, and lost that hostility to sexual intercourse which she had had. She has borne since that time three children. I have examined her after each birth, and the condition of the cervix has been perfect.

Dr. Richard Douglas, of Nashville, Tenn.—In one of the given cases we have a double uterus; in the other a bilateral laceration with septic inflammation after labor. One is a mistake in diagnosis; the other is an accidental recovery, and it seems to me from neither case should we draw the rule of practice. Both are exceptional, and we can only establish surgical principles upon facts, and not upon errors, in unusual cases.

MENSTRUATION AND THE REMOVAL OF BOTH OVARIES.

By George J. Engelmann, M.D.,
St. Louis, Mo.

In the discussion of this question we must distinguish between menstruation proper—a regular recurrence of the monthly flow, continuing steadily with all the characteristics of menstruation until the time of the natural menopause—and uterine hemorrhages as they occur after operations on the pelvic viscera, especially after laparotomy, and also after the menopause; these *bleedings*, after the removal of both ovaries, which vary in cause and character, have all been promiscuously thrown together *as menstruation.* In some cases we may not be able to demonstrate the cause of the flow with positive certainty; in others we can do so, and, undoubtedly, if a post-mortem examination were possible, satisfactory anatomical explanations would always be found. First of all, we have those bleedings which occur during and soon after the operation, with more or less regularity, gradually diminishing, to cease entirely after a few months, or, less often, years. Then, again, there is a class of cases, perhaps more frequent, in which a period of quiescence follows the removal of the ovaries, but a bleeding, called menstruation by some, appears after from three to six months, reappearing at intervals of three or four weeks, with perhaps a severe attack of flooding now and then, to cease in the course of a year or two, a condition resembling the frequently prolonged period of the change of life. As I have said, these bleedings have been called menstruation by some who have been satisfied with

the vague explanation of *habit.* A certain impulse does exist, but it is not habit; it is a remnant of nerve influence emanating from ganglia or nerve-stumps—that nerve influence upon which so much stress is placed by Johnstone; in cases in which this *seems* to explain the bleeding a cause will be found in the uterus which favors the occurrence of hemorrhage, and if this does not exist, we would, I am certain, upon investigation, find a temporary activity of ovarian remnants: a tangible explanation exists for all regularly recurring bleedings. Irregular bleedings soon after the operation are readily explained by the nerve irritation and the disturbance in the circulation through the cutting out of important circles, or by the lingering activity of ovarian remnants, which are gradually destroyed either by absorption or the imbedding within inflammatory deposits.

The third ovary, which has served to explain many of the peculiar phenomena, unquestionably of ovarian origin, which have been observed to follow double ovariotomy or oöphorectomy, is so rare that I hope this reasoning is forever dispelled, like a shadowy mist beneath the clear rays of the sun, by the new light which pathological anatomy and microscopy have cast upon this hazy subject.

The possibility of menstruation or pregnancy after double ovariotomy was denied by some, and asserted as a fact by other equally conscientious and scientific observers: oöphorectomy was denounced as a useless operation on account of its failure to produce the menopause, and on account of the occasional continuance, more or less marked, of ovarian pain, for which the operation had been performed. The operation was denounced because it had not relieved these patients; the operation was rashly condemned as impotent to accomplish the purpose designed, on account of apparently well-authenticated cases of the continuance of menstruation, or the occurrence of pregnancy, after oöphorectomy and double ovariotomy. The truth of these statements, the possibility of their occurrence, was doubted by some; by others the third ovary was suggested as a solution of the mystery. Wordy wars ensued;

theories and counter-theories were set up and knocked down, and in very few of the cases cited were the facts fully established, or was the *corpus delicti* examined.

The explanation, as given us by microscopic investigation, is so natural and so simple that these apparently wonderful cases no longer astonish, and the wide difference in the results observed and reported is no more than we should expect from the varying peculiarities and conditions in individual cases. It is the remnant of ovarian stroma, however little, which has been left in the pedicle, or such of the ovarian tissue as was not removed, and which was not destroyed, which continues its activity and determines the following menstruation or conception, if healthy, and the suffering generally referred to the ovary, if diseased. These particles may survive or they may be destroyed by consequent inflammation or necrotic disintegration, or absorbed in a process of retrograde metamorphosis.

I will briefly detail two very striking cases, from my own practice, which clearly demonstrate that, if some of this stroma remains in the pedicle after double ovariotomy, the tissues of the patient be healthy, and her constitution good, this small remnant of ovary continues its activity and performs all the functions of the entire organ; that menstruation is not interfered with, and fecundation is possible.

The operation for removal of the appendages is generally performed on account of the suffering caused by diseased ovaries, and we operate under the most varied conditions, upon morbid structures often intimately blended with the surrounding parts; some of this tissue may be left *in situ*, however careful the surgeon may be, because in these cases the diseased organ is often firmly imbedded in the surrounding tissues, agglutinated with them, and difficult of removal. Strange as it may seem, it is a fact that such shreds, or parts of diseased ovarian tissue, may continue to perform the functions of the intact viscus, and, to a certain extent, give rise to symptoms similar to those which have been occasioned by the diseased organ itself; wherever it is possible to *remove com-*

pletely all ovarian tissue *menstruation* ceases, and this continuance of the aggravating symptoms is not likely to be found.

Let us no longer theorize as to the origin of such symptoms after oöphorectomy or of continued menstruation after double ovariotomy, but let us search for facts.

Several cases of this kind have been recorded, and one of the most striking of these I will mention, as it coincides strangely with one observed by myself, occurring at the same time and published at the same time.

I performed ovariotomy, in April, 1880, upon a patient who continued to menstruate, and who was delivered of a healthy child in August, 1884; and Prof. Schatz, of Rostock, reports a case identical in all important details, upon which he operated in February, 1880, who was delivered in May, 1885. I will briefly recall the more important facts in my case, which was published in full, with others, in a paper on "Ovariotomy; Its Difficulties, Diagnostic and Operative. Continued Menstruation after Double Ovariotomy," in the *American Journal of the Medical Sciences*, for April, 1882. (The case was also recorded in a paper read before the Medico-Chirurgical Society of St. Louis, November 28, 1881.)

Case I.—Mrs. T., from Kansas City, consulted me in April, 1880, on account of failing health due to an abdominal enlargement of less than a year's growth. She was thirty-two years of age, mother of five children, the youngest being two and a half years old; she first menstruated in her thirteenth year and was regular ever after, suffering no pain; her labors were easy, and recovery rapid and complete. After the development of the tumor the menstrual flow continued regular, but more profuse than formerly, being very free and continuing for seven days, instead of four days, as usual.

On Thursday, April 22, 1880, I operated, in the presence and with the assistance of Drs. Prewitt, Schenck, Engelmann, Sr., Nelson, and Fischel. The operation presented some peculiar features: a fan-like expansion of the bladder to within an inch of the umbilicus; adhesions of the greatly thickened omentum to the tumor, bladder, and abdominal wall, with the presence of a

dozen or more small peritoneal cysts, many with pedicles six or eight inches in length, pendent from the peritoneal covering of liver, diaphragm, and intestinal tract; numerous delicate adhesions were severed and tied. The tumor was a uniform, colloid, thickly gelatinous mass, somewhat more consistent toward its circumference, but not enclosed in any distinct capsule, of an appearance very much like an orange water-melon, and of similar size. Being too large to be removed through the opening, too soft to be cut to pieces, I was obliged to claw out this glutinous, colloid mass by the handsful, after dragging the tumor into the incision, with the patient upon her side; the long pedicle was tied and dropped. This was upon the left side. But the right ovary was also found to be diseased, containing a cyst the size of an orange; this also was tied and removed, the tube being left intact. Recovery was uninterrupted by any untoward symptoms.

After her return home she enjoyed the most perfect health, and was able to endure every exertion. Menstruation continued with perfect regularity.

Patient had menstruated last, prior to the operation, on the 15th of April, 1880; on the 22d I operated; the next flow appeared May 18th, and was quite profuse for four or five days; this was five weeks after the last normal menstruation. Three weeks later she again became unwell, Thursday, June 10th; this was resuming the early habit, and returning into the well-worn groove of the previously unusually regular menstrual cycle, the flow appearing at the regular time as was her habit before the operation. She experienced very little backache, no pain or discomfort, and the discharge was free. The next period appeared on the 10th of July, lasting until the 14th; then came a slight flow from July 30th to August 1st, and again August 10th to 11th. For a few months the flow became very scanty, but was accompanied by no pain and but very slight backache. I naturally supposed that the discharge would grow less, and, finally, cease; but, on the contrary, after this slight irregularity, menstruation again became normal and regular, and so continued to the beginning of November, 1883, when it ceased, and my patient soon after complained of peculiar symptoms, stating that were she not conscious of the fact that both ovaries had been removed she would suppose herself pregnant, judging from the similarity of her

symptoms to those in the early days of previous pregnancies. Menstruation did not return, and the abdomen enlarged; local physicians consulted claimed a healthy pregnancy; my own opinion, without seeing the case, was to the effect that a malignant tumor was in progress of development, since I knew so well how thoroughly the tumor was pedunculated and how completely both ovaries had been removed. Toward the end of the fourth month all doubts of the anxiously expectant woman were solved by the feeling of motion, which gave her the happy consciousness of being soon about to become a mother, and brought relief from the dread fear of a new tumor. August 16, 1884, nine months after the cessation of the menstrual flow, a healthy boy baby appeared, and solved all still remaining doubts of wondering friends and observant physicians.

Mrs. T. recovered thoroughly and speedily from her confinement, and the remnant of ovarian tissue did not long remain idle, for four weeks after menstruation returned, and has since then continued with perfect regularity. The child, strong and rapidly developing, began to walk at the end of the first year; having twelve teeth, among them two molars.

The key to the situation is the remnant of the cystic right ovary, which I had believed to have removed *in toto.*

The left ovary had completely disappeared in the large colloid tumor, which had a very long and slender pedicle, cut near its uterine end, hence it is not probable that any ovarian tissue remained on this side, and the tube was completely removed. The right ovary was in its normal position, and from it had developed a cyst of the size of an orange, by which the ovary had not yet been destroyed, and which had not yet stretched the tissues to any extent, so that no real pedicle existed. The ovary was ligated and removed as in oöphorectomy, so that it is possible that a little of the tissue may have remained on the distal side of the ligature. The tube on the right side remained intact, and is not visible in the specimen. In an earlier paper I made the erroneous statement "that the specimen in my possession precludes the

possibility of a part of the ovary having remained *in situ*, and thus accounting for the continuance of the flow."

Microscopic examination now reveals ovarian tissue upon the cut surface, the ovary having evidently been inflamed and enlarged, and, as the cyst developed, it was dragged upward, then a portion of its tissue became distended and was dragged out, if not into a pedicle, yet losing its well-defined margin.

Case II.—Case of Prof. Schatz, of Rostock (*Centralblatt für Gynaekologie und Obstetrics Gazette*):

On February 20, 1880, Prof. Schatz removed a large cystic tumor of the left ovary, including the outer third of the Fallopian tube and all the ovarian tissue that could be found. The right ovary was of the size of a walnut, and showed signs of cystic degeneration; it was tied by means of three silk ligatures passed between it and the broad ligament, and was cut away in such a manner that a *piece of ovarian tissue, at the most two millimetres broad, was left on the proximal side of the ligature; the right tube remained intact.* On March 21st, when the period was due, the patient was seized with a paroxysm of pain in the right side of the hypogastrium and right thigh, with vomiting and high fever for four days; these symptoms recurred on April 8th, and again on May 8th, when the pain extended to the left hypogastrium. No deposit could be detected in the pelvis. The first show appeared on May 9th; it lasted three days, pale and scanty, recurring on May 31st; in the interval, attacks of pain occurred in the inguinal region. On June 11th a swelling about the size of a plum was detected behind and to the left of the uterus, which was anteflexed. On June 28th severe sacral pains came on, which radiated to the left inguinal region and disappeared at the coming of the period, which was copious and lasted six days. On July 15th the uterus was found to be small and retroverted. Henceforth the catamenia appeared regularly up to the patient's marriage in April, 1884. In the early part of August the last menstrual flow occurred, and symptoms of pregnancy became marked in September. May 12, 1885, labor set in, lasting thirty-six hours, and then only terminated by the forceps.

The right ovary had been preserved, and the cut surface, upon examination, was found to be undoubtedly ovarian

tissue containing Graafian follicles. The tumor of the left ovary was also subjected to a thorough examination, and as the terminal position revealed no ovarian tissue, it was evident that the entire organ had been removed.

A reviewer in the *Obstetric Gazette* truly says that "this case proves the necessity of a very thorough removal of the ovaries when oöphorectomy is performed for the cure of bleeding myomata of the uterus, and that it is evident that fimbriæ of the Fallopian tubes can lie in contact with a mere trace of ovarian tissue as well as with an entire ovary," and, furthermore, we see that a mere trace of ovarian tissue, like a few epithelial scales upon a granulating surface, may develop the full functional activity of the organ from which they spring."

The similarity of the two cases here related is striking; in both the left ovary had degenerated, and the large tumor which was removed was well pedunculated; in the right ovary the disease was but incipient. In my case a cyst the size of an orange was found; in that of Prof. Schatz a mere cystic degeneration of the ovary was in progress, and the organ itself seems hardly to have exceeded its normal size, as he says it was of the size of a walnut, and no pedicle presented, hence in the removal a small segment of ovarian tissue was left, as frequently happens in the operation of oöphorectomy. In my case menstruation was not interrupted by the operation, but continued almost normal, growing somewhat more scanty after some months, but without presenting any striking features, and this is probably due to the fact that I did not interfere with the broad ligament or tube of the right side, but tied the ovary in the pedunculated portion; whilst the operation of Prof. Schatz was an oöphorectomy, and the ligatures which passed through the broad ligament must have disturbed the relation of the tube and the remaining ovarian stroma; hence menstruation was inaugurated with decidedly abnormal symptoms. At the first period a flow did not appear, but vomiting and high fever, accompanied by paroxysms of pain in the right side and thigh. May 9th and 31st a very slight, scanty flow appeared; natural conditions evidently being approxi-

mated; the lymphatic deposits about the tube and ovary probably being absorbed. On June 11th, the fourth menstrual period, a swelling the size of a plum was detected behind and to the left of the strongly anteflexed uterus; evidently a small hæmatocele. Upon the fifth return, June 28th, severe sacral pains appeared, but vanished with the copious flow, which continued for six days. Finally, July 15th the uterus was found small and retroverted, and henceforth the catamenia appeared regularly up to the patient's marriage; plastic exudation had been absorbed, the tubal opening and ovarian remnant approximated and restored to a healthy state, so that menstruation was no longer interfered with.

Case III.—Mrs. H., aged thirty-one, married eleven years, sterile, suffering from nervous and physical prostration, consulted me first in February, 1888. She had been confined almost entirely to her room for the past year, suffering severe pain from the slightest jar, so that she could walk but short distances at a time. Patient has suffered intensely for the past eight years, but complained of pelvic pain even before her marriage. The menses appeared in her seventeenth year, usually lasting four or five days, always very regular, without pain, but of late years they have recurred every three weeks and continued profusely for five days, but still without pain, unless their appearance should have been retarded. One week after the cessation of the flow a bloody, watery discharge, which was also seen after any slight physical exertion, appeared and continued for four or five days.

Examination revealed a slightly retroverted uterus, but little enlarged, slightly retroflexed, low in the pelvis, with an endometritis polyposa; the right ovary was found enlarged and retrodisplaced; a large cystic body was distinctly felt to the left and somewhat behind the cervix, with a small indurated mass, apparently an inflammatory product, in the broad ligament, which proved to be the ovary, whilst the cyst to the side of the cervix proves to be the dilated tube. This explains the pain which was caused by every jar, every step, and also the pain upon intercourse, which was unbearable for the past eight years, but had existed even when she first married, eleven years ago.

A six months' treatment, with rest, tonics, and hot douches,

served to keep the patient comfortable, but in nowise altered the existing conditions. As soon as she exerted herself in the slightest degree all previous pains returned. Removal of the diseased appendages was advised and undertaken in April, 1889, this brave woman coming to the city alone determined to seek relief. The right ovary was found enlarged, retro-displaced; the right tube thickened and dilated. The greatly distended left tube was found low down in the pelvis to the side of the cervix, whilst the ovary was a small, contracted, indurated mass, firmly adherent, like an inflammatory product, to the broad ligament, appearing precisely like a small exudate. The only difficulty experienced in the operation was the removal of the ovary, which I could not dissect off, but was obliged to cut away from the broad ligament with my finger-nails, and so left small fragments of ovarian tissue adherent to its peritoneal covering. Recovery was normal, and the patient returned home with the expectation of now being relieved, not alone of her suffering, but also of the annoying recurrence of the menstrual flow.

October 15th, seven months after the operation, I received the following report: Mrs. H. is in excellent health; has gained over twenty pounds; has a perfect complexion; feels better than at any time since girlhood; walks as well as ever; menstruation is regular, but profuse (evidently due to the hyperplastic condition of the endometrium, which was not interfered with in any way), lasting almost one week; sexual intercourse is no longer distasteful, and she is entirely free from pain during the act, which has never been the case during the eleven years of her married life. Her only complaint is a leucorrhœa, which has not been improved. She feels perfectly well and strong, and is annoyed only by vaginal discharge and a slight weakness during the period and some days after from the somewhat profuse flow.

Examination of the appendages shows a complete removal of the enlarged ovary and tube on the right side, removal of the tubal sac on the left and the contracted ovary on the same side, with the exception of its serous surface and particles of ovarian stroma in the part adjacent and adherent to the broad ligament.

Microscopic examination and careful observation having

taught us in these cases the true state of affairs, we can now readily explain the varying symptoms of each, and the numerous mysterious cases of menstruation after double ovariotomy and oöphorectomy, and those annoying cases of imperfect results following the removal of the diseased ovaries. It has long been known that it was not always possible to remove, even with the greatest skill, the entire mass of ovarian tissue which was imbedded in pathological formations and agglutinated to surrounding organs. On the other hand, it does not follow that the *remnant* of ovarian tissue which is left in the pelvic cavity *must develop* the functional activity of the ovary, and this is natural: in some cases where an active circulation exists, in healthy tissue, the pedicle remains large and full, forming a smooth, rounded surface; in others a retrograde metamorphosis with shrinkage, and even necrosis of the upper portion, takes place. In those cases in which ovarian tissue is left in the pedicle we will have, in the first instance, continued menstruation and functional activity in such ovarian tissue; in the second, in which retrograde metamorphosis or necrosis takes place, we would find the sequence naturally to be expected from the removal of both ovaries, that such functions and symptoms which we trace to that organ disappear after the operation. And such are probably the cases reported by Schröder in the paper in which he describes those ovariotomies in which he purposely left a part of the ovary. Five of these recovered, though pregnancy did not occur in any of them; either sufficient time had not elapsed since the operation, or the nutrition of the tissue left in the pedicle was insufficient to preserve life and functional activity.

I will here add a fourth case, bearing indirectly upon the subject, the result of an observation recently made, which must seriously influence the importance of oöphorectomy in cases of nervous suffering.

CASE IV.—*Pain caused by diseases of uterus or ovaries is not necessarily relieved by removal of the offending organ.*

This was exemplified in a remarkable manner by a patient

from whom uterus and ovaries had been removed on account of a sarcoma; her general health was greatly improved, but nervous symptoms, pain in the head, referable to uterine and ovarian disturbance, disappeared for a short time after the operation, then returned and grew worse, and were aggravated by pains in ankles and heels, so frequent in women, which grew so severe that patient could hardly walk. Sent to a neurologist, the trouble was treated as peripheral by electricity applied to head and feet; temporary relief was afforded, but the pains returned, when she was placed in my hands. I treated her as if the suffering were a hystero-neurosis, by vagino-abdominal galvanism, the negative, cotton-covered ball electrode in the vagina, and the medium abdominal plate with the positive pole on the abdomen, over the site of the fundus, and immediate relief was afforded; the pain completely disappeared after the third application of thirty milliampères for five minutes. The centre of pain was evidently in the extremity of the same nerves which had previously carried it, a phenomenon similar to the feeling of pain in the toes after amputation of the leg.

To what influence are the hemorrhages which occur after the removal of the ovaries to be ascribed? Are they physiological or pathological? Are they a continuance of the menstrual flow, or are they intermittent bleedings? Our best operators and most progressive gynecologists are still at war in regard to this very point; so bitter is the strife that Mr. Lawson Tait refers to it in the following words in the presidential address delivered before the British Gynecological Society, January 12, 1887; he says: "It is most amusing to hear Sir Spencer Wells and Mr. Knowsley Thornton insist that for the arrest of menstruation by operation every scrap of ovarian tissue must be removed."

The subject was prominently referred to in the discussion of Dr. Hoffman's paper before the Philadelphia Obstetrical Society in its meeting in September, 1889, and the frequency of such hemorrhages was acknowledged by all who took part in the discussion, being referred to habit by some, and explained as a safety valve by others. In one of these cases in

which monthly bleeding recurred after the removal of both ovaries by Dr. Hoffman, Dr. Baldy some months later curetted the uterus and found malignant disease. Dr. Hoffman has likewise stopped this apparent menstruation—this monthly recurrence of bleeding—by the curette and other appropriate treatment, thus demonstrating that it was not a menstruation, but a bleeding, caused by hyperplasia or by hypertrophy of the uterine mucosa.

I refer to these discussions because whatever the reasons assigned for the bleeding, an analysis of the cases there reported distinctly proves the assertion made that this bleeding is not a menstrual flow correctly speaking, although it does occur at more or less regular intervals; the bleeding occurs, *provided that conditions favoring hemorrhage exist in the uterine tissue*, and it appears when the impulse is given by the remnants of the ovarian nerves or ganglia, any irritation of which will result in a partial revival of the great functional wave which controls female life from puberty to the menopause. In many cases, hitherto crudely reported, careful observation and examination would undoubtedly have revealed a distinct cause, and demonstrated that it is either menstruation, and that ovarian remnants are retained, or that it is a bleeding due to pathological conditions of the uterine mucosa. In this advanced period of medical science, we should no longer fall back upon such vague explanations as habit or safety valve, when for want of facilities for investigation we are unable to determine the precise cause.

A careful investigation of this subject has recently been made by Glawecke ("Physical and Mental Changes After Removal of Both Ovaries, and After Extirpation of the Uterus," *Arch. f. Gyn.*, xxxv. 1), based upon a large number of cases from the records of prominent operators, and in eighty per cent. of the cases in which both ovaries were removed he finds that menstruation ceased at once or after a short time; in twelve per cent. of the entire number a bleeding at rare intervals, and in small quantities, continued for a time; in some few a substitute for menstruation, which he

calls atopomenorrhœa, appeared. In one-half of the cases molimen recurred, perhaps the result of the remaining congestion, or due to irritation from nerve centres. The phenomena of the menopause were present almost invariably; hot flushes, sweating, etc., atrophy of uterus and vagina usually occurred, nutrition improved, the patient grew stout; in short, a climacteric followed the operation which was very much like that which occurs naturally, and all the data serve to verify the fact that the impulse of menstruation proceeds from the ovary, and consequently the period ceases when the determining force is removed.

The apparent disparity of results, the widely differing explanations given for apparently similar results—results not fully understood, or misinterpreted—and the lack of post-mortem records, have caused this great divergence of opinion. In many cases in which the ovaries, to the certain knowledge of the operator, have not been completely removed, menstruation ceases, because that part of the organ which remained in the distal end of the pedicle has atrophied or sloughed, and has so been destroyed, notwithstanding that, to the best belief of the operator, the organ in part remains; hence he cannot well explain the symptoms, the cessation of the flow, notwithstanding the remnant of ovarian tissue. Again, the operator, as in my case, is convinced that the ovaries have been completely removed; he may even have the specimen to verify his belief, yet menstruation continues. He naturally concludes that menstruation has nothing to do with ovulation; but if he subjects the specimen to examination by a competent microscopist he will find that the capsule is not intact and that some shred or scrap of ovarian tissue has been left *in situ*, and even if beyond the ligature, as in my case, this may develop functional activity and menstruation continue; conception may even take place if the tube is preserved. No part of the pedicle has suffered, but even its extreme end beyond the ligature has preserved its vitality, and proliferation may even take place. Then in this patient, from whom *to the best belief of the surgeon*, the *ovaries* have been *completely re-*

moved, the *functions continue*, and he frames a theory in accordance with what he takes to be the fact. I may add my own belief that in some cases of undoubted complete removal of the ovary a partial menstruation may continue for a time by reason of the influence upon the uterine plexus exerted by the remnants of the ovarian nerves, which, under peculiar circumstances, may still automatically perform their functions, precisely as they did whilst still influenced by the ovary before its removal, provided that the uterine tissue is in a condition favoring hemorrhage. Why should not the bisected ovarian nerve, the stump with its terminal fibres removed, still continue to convey the habitual impetus, precisely as we have seen in the case mentioned, former uterine pains still made evident in distant parts after the uterus and the irritated terminal fibres had been removed? Or as the old soldier, whose leg has been taken off at the hip, is made conscious of the pains in the lost foot by the activity of the fibres in the stump of the sciatic nerve?

I believe that the case I have here recorded, together with that of Schatz, affords a solution of the problem which must be settled by the microscope and the scalpel, but never by the pen.

Conclusions.—In considering the question of the cause of the persistence of menstruation after the removal of both ovaries, we must bear in mind the more important of the reasons assigned:

1. Habit.
2. The presence of a third ovary.
3. Remnants of ovarian tissue left *in situ*.

Some have ascribed the cause of persistent menstruation to habit—an explanation which I do not accept, and which cannot be admitted even when it is a regularly recurring and persistent flow with the undoubted characteristics of menstruation.

Morbid activity, or irritation of the spinal or ganglionic centres, or of the bisected nerve termini, may serve to explain recurrences of uterine hemorrhage for a time, but habit is a

term which must be excluded from any scientific discussion of the question.

We do know that uterine hemorrhage frequently occurs soon after operations on the pelvic viscera, especially after laparotomy, evidently due to the congestion caused by the disturbance of circulation, and if the spermatic and other supplying vessels are cut, by the increased flow to the remaining arteries, especially the uterine.

We also know that bleeding, simulating menstruation, occurs under various conditions without ovarian activity, thus from the congested or subinvoluted uterus during childbed in old age, if the tissues are relaxed, or if the endometrium is in a state favoring hemorrhage, with an endometritis polyposa or hemorrhagica; in many of these cases in which the appendages are removed, or ovariotomy is performed, a diseased, congested, or enlarged uterus exists, and by reason of the ligation of numerous vessels the flow of blood through the uterine artery is increased, and in such cases in the already congested organ the habitual influence of the menstrual wave, of the uterine flood, in obedience to the irritation arising from the nerve stump or the spinal and ganglionic centres, may suffice to cause an increased pressure and a flow of blood at intervals, especially at the times when menstruation should have occurred, but this will never persist for any length of time.

It is in this class of cases, with a uterine status favoring hemorrhage, that the disappearing wave of the uterine flood, or, more correctly speaking, the influence exerted by the ganglia and nerve stumps, the condition vaguely and improperly called habit by some, will lead to the semblance of menstruation, but never to a normal and persistently recurring flow.

It is now well known that a third ovary does occur, although only a myth until 1863; one such case, and another of an accessory ovary, is pictured by Winckel. Olshausen, Klebs, and others have observed and published isolated cases, but notwithstanding all the numerous laparotomies of late years by competent observers, no one has met with a third ovary except Olshausen in the removal of an ovarian cystoma.

Continuance of menstruation after the removal of both ovaries has been repeatedly reported, and the presence of a third ovary so rarely, that *a priori* we must conclude that an additional remaining ovary cannot ordinarily be accepted as an explanation for this phenomenon.

Whilst the present status of our anatomical and physiological knowledge will not admit of either of the above explanations, it is fully in accord with the facts observed in the cases reported, which conclusively prove that the continuance of menstruation — undoubted menstruation, regular and persistent—is due to the presence of ovarian tissue, however small in quantity, and wherever it may have been left.

From the history and microscopical examination in my own cases and in that of Prof. Schatz, we may safely draw the following *physiological conclusions,* which are corroborated by numerous cases of oöphorectomy and of double ovariotomy now observed, the histories of which have been recorded for a sufficient length of time after recovery from the operation :

1. That the continuance of *menstruation* after removal of both ovaries is due to remnants of ovarian stroma left *in situ.*

2. That particles of ovarian tissue, however small, which remain after the removal of the greater portion of the organ, whether or no the Fallopian tube be preserved, *may* retain their activity and continue the functions of the entire organ; and from this we infer that menstruation is more or less intimately associated with ovulation, and that the menstrual condition indicates the ovarian status, provided the uterine tissues be normal in character.

3. That remnants of ovarian stroma do not *necessarily* preserve their vitality and functional activity.

4. That even elongated pedicles may contain ovarian stroma in which the functional activity of the organ may be continued.

5. That the ovary is an essential factor in the functional life of woman, and that menstruation and healthy ovarian activity, are inseparable.

The deductions of practical value to the operator are as follows:

1. If menstruation is to be checked, and the change of life produced, it is requisite that every particle of ovarian stroma shall be removed, if the result desired is to be expected *with certainty.*

2. If shrinkage of fibroids, limitation of hemorrhage, or cessation of annoying symptoms is to be accomplished with the greatest possible certainty, both ovaries must be *completely* removed.

3. In the performance of double ovariotomy (not oöphorectomy) in women not yet beyond the climacteric, and not suffering from uterine reflexes, such healthy ovarian tissue as may exist should be spared in order that functional activity may not be impaired.

DISCUSSION.

Dr. W. D. Haggard, of Nashville, Tenn.—I have been very much interested in the paper by Dr. Engelmann. He voices my sentiments fully when he gives utterance to the belief that most of the hemorrhagic discharges from the uterus after the removal of both ovaries and tubes depend upon some other cause than that of menstruation.

It is much more rational to suppose the hemorrhage depends upon the changes which the blood supply to the endometrium has undergone. Under the periodical stimuli afforded by the ovaries and tubes the bloodvessels supplying the endometrium become so much congested that under the influence of excitement and the orgasm incident to the function of menstruation, the vessels rupture. Being now deprived of the stimuli thus afforded the congestion stops short of rupture, and the prolonged accumulations of blood may result in fungous masses projecting from the endometrium which give rise to the hemorrhage; or it may be that mucous polypi are found and bleed in the same way.

In this connection I will say that in January last I removed both ovaries and both tubes to within one inch of the uterus. I think I removed the entire ovarian stroma. It is possible, however, that I may have left a very minute particle. Be that as it

may, three months after the operation she had a slight hemorrhagic discharge from the uterus which has continued to recur at intervals of from twenty-one to twenty-eight days since, the last three hemorrhages being more profuse than any which had preceded.

I neglected to say that I have never seen in any case such an amount of congestion of all the tissues exposed by the incision as was present in this case. The tubes and ovaries, and intestines that lie adjacent to the ovaries, were all of a dark reddish-brown color. The uterus was large and flaccid and had been treated locally for years by various physicians of eminence and ability. The ovaries were both found diseased, each containing one or more small abscesses, one of which burst and was discharged before the ovary could be removed. I submit that in this case the hemorrhage does not depend upon ovarian stroma left, but upon the conditions growing out of the endometrium.

Dr. A. W. Johnstone, of Danville, Ky.—This is an interesting subject. I could talk hours on it. If there is any one subject that is interesting to me, it is the theory of menstruation. Let me state here clearly that for five or six years I have been working at it, and I do not believe that the ovary has any more to do with menstruation than the clitoris has. To prove this, I have left ovarian tissue behind, and I have stopped menstruation; I have done it several times. The reason I did it was not intentional. I was not experimenting on my case, but the inflammation rendered the ovary so tight that in order to get my button (?) to hold my ligature I left not only the Wolffian body, and the middle kidney of fœtal life, but I left some of the ovary proper. Let us take the analogy of the thing. Here is a little epithelial body, the only one in the world which controls another body by reflex action. The uterus is controlled by the orders of the spinal cord or sympathetic nervous system, and the reason you fail to stop menstruation is because you fail to cut off the orders of the nerve which carry impressions.

The first time I caught the idea of the nerve which controls menstruation was in a case of Mr. Tait's. He operated on a patient a second time. In the first operation he failed to secure the menopause by the operation. The ovaries had been completely removed. To illustrate: suppose my hand represents the body of the uterus, my arm represents the Fallopian tube, and

this paper which you see represents the nerve. Well, at the first operation the Fallopian tube was cut out; in his next operation it was cut off below—that is, the nerve trunk. I have seen menstruation follow removal of the ovaries in several cases, simply from the fact that the operators missed the nerve which controls it. I believe it is the neurotomy we do, and not the removal of the ovary, which brings on the menopause.

Take the history of the ovary: Graaffian follicles form, wash away from the cradle to the grave. That is the reason why we have ovarian tumors at all ages. The Graaffian follicles begin to ripen before the babe is born. They never stop. They go on through life.

Dr. Virgil O. Hardon, of Atlanta, Ga.—I think Dr. Engelmann's paper is in the right line. It is in accord with my own experience I can add to Dr. Engelmann's cases two from my own experience, which seem to corroborate the views expressed by him as regards menstruation.

I operated on a patient a year and eight months ago for bleeding fibroid, removing both ovaries, and in removing the second ovary I feared that I did not remove all the ovarian tissue; but the precarious condition of the patient would not let me continue the operation further; I had to content myself with what I had taken away. This patient had a fibroid tumor and had had repeated hemorrhages, which reduced her to a low state of health. She recovered from the operation and has menstruated with unvarying regularity from that day to this. But this case seems to controvert the view of Dr. Engelmann in one respect. Although the patient has menstruated, and continues to menstruate at the present time, yet there has been shrinkage of the fibroid tumor to a marked degree, and there has been no hemorrhage whatever, except the normal menstrual flow from that time to this.

The other case which bears upon this question, and to which I desire to refer, was that of a woman upon whom I operated in December last—about twelve months ago. I removed both ovaries for atrocious menstrual pain, which occurred every month, and which could only be controlled by large doses of morphine, and which had failed to disappear after the continued application of electricity and all other means. I removed both ovaries and found them in a state of cystic degeneration, several small cysts being found, about the size of large marbles, in both ovaries. The

patient was completely relieved of all her pain. That patient has menstruated from that time to this, with some irregularity. In other words, in the twelve months which have elapsed from that time to this she has menstruated ten times, missing two menstrual periods during the spring and summer—April and June, I think. There is almost complete regular menstruation in that case, although the ovaries were unquestionably removed in their entirety, and this would seem to disprove Dr. Engelmann's theory with regard to menstruation. But the fact that she does not menstruate with entire regularity might place her in the category of those cases which he speaks of as irregular menstruation resembling the gradual cessation of menstruation at the time of the menopause.

Now, in regard to the views of Dr. Johnstone, I do not pretend to say what truth may be in them. I would like, however, to make this statement: that the accumulated experience of laparotomists for many years seems to show that the entire removal of the ovaries does, as a rule, cause the cessation of menstruation. There is no controverting that fact, and that the cases where menstruation continues after the ovaries have been removed are certainly exceptional ones.

Dr. Roberts.—I would like to ask Dr. Hardon whether in his second case menstruation was as painful after as before removal of the ovaries.

Dr. Hardon.—The patient is completely cured of her pain. She has been in perfect robust health from the time of the operation to the present. She has gained considerable in weight—I do not know exactly how many pounds, but probably fifteen or twenty pounds.

Dr. Richard Douglas, of Nashville, Tenn.—I only rise to question a statement made by Dr. Hardon, and it is this: It does not appear to me that the experience of ovariotomists is that menstruation is controlled and stopped by the removal of the ovaries. It has been through the labors of Mr. Tait in removing completely the tubes and ovaries that Battey's operation has fallen to the ground. By Dr. Battey's operation we only remove the ovaries, and they do not control menstruation; whereas in Professor Tait's operation, which consists in the removal of both tubes and ovaries, you embrace in your ligature the nerve which influences much control over menstruation.

Dr. A. V. L. Brokaw, of St. Louis.—I must take exception to the credit of removal of the ovaries and tubes being ascribed to Tait. I admire Dr. Tait's skill as an operator, but as a man I do not. With characteristic modesty he improves upon some operation and it goes out to the world as his operation. The annals of gynecology give the credit to Battey. Twice in this Association I have heard the credit given to Tait for a certain operation. Tait deserves no credit for suggesting the removal of the tubes. Battey does.

Dr. W. H. Wathen, of Louisville, Ky.—We have no knowledge of facts to justify a positive conclusion as to what controls menstruation. We are more familiar with the laws that govern menstruation than we formerly were, but it will require more observation and more experience to convince medical minds that any one cause controls it. If the theory advanced by Dr. Johnstone be correct, it is necessary to remove the tube and nerve near the uterus to stop menstruation. How then can we account for the cessation of menstruation in cases where the ovaries were removed, but the tubes were carefully avoided? Many such cases are recorded. The nerve that Dr. Johnstone speaks of—which was described by Frankenhauser in 1877—has its origin from the ovarian and uterine nerves. Doubtless the ganglionic or vaso-motor system of nerves may, in some special way, be connected with it. If we only remove the ovary it is not probable that this nerve would be divided. This will be apparent upon examination of the relation of this nerve so beautifully shown in the illustrations of Frankenhauser.

Mr. Tait calls attention to the fact that he now gets more rapid convalescence in his tubal cases because he cuts close to the uterus and divides this nerve.

Dr. Johnstone.—I rise not to take part in the debate again, but more from a personal point of view, to defend an absent friend. The statement that Mr. Tait claimed the flap-splitting operation is not true. In the last one or two numbers of Mundé's *Journal* will be found his full statement of the flap-splitting method, wherein he says he had used it without knowing it had been previously described, some twenty years ago, by a Dublin surgeon. He there gives him due credit and says all about it that is necessary.

So far as the Battey-Tait difficulty is concerned, that occurred

before I knew much about gynecology, and when gynecology was to me the most horrible thing on earth. Of course, as to that part of the difficulty I can say nothing, They are both my friends. I cannot permit the assertion to pass that he (Tait) deliberately steals other men's work and plants his name on it.

Dr. Engelmann.—I am very much gratified at having had the opportunity of reading this paper before this Association, and I am greatly pleased that it should have called forth so interesting a discussion and such a variety of opinions and meritorious theories. Notwithstanding all that I have heard I cannot help but persist in the opinion I presented, and I believe that the experience of the great mass of operators coincides with my own, namely, that where both ovaries have been completely and thoroughly removed menstruation ceases, and the hemorrhages which occur will not recur at regular intervals, and will not continue up to the natural period of the menopause. Out of hundreds of cases which have been collected menstruation ceased in all but some 12 per cent. after removal of both ovaries; and it is not stated whether scraps of tissue were left *in situ* or not in these exceptional cases. In removing the ovary without the tube we are very liable to fail in a clean operation; the ligature is tied, and as you begin to cut you will find that in order to steer thoroughly clear of it you are liable to cut somewhat into the ovarian tissue. Menstruation may continue and it may cease, as the stump develops or decays; if the ovarian remnant in the stump shrinks, if absorption takes place, or if an inflammatory deposit is thrown about it and it becomes encysted, menstruation will cease; the tissue will be non-active. On the other hand, this particle of tissue beyond the ligature may remain healthy and retain its activity. Dr. Johnstone tells us that he has left ovarian tissue and that menstruation nevertheless ceased, but that it was not so in all cases. Why? Because one-fourth or the sixth part of an ovary does not necessarily and invariably remain functional and healthy; it may be absorbed, or inflammatory action may destroy healthy activity. A much smaller part of ovarian tissue may retain functional activity. We cannot rely upon the continuation of menstruation after small bits of tissue have been left; we can only rely upon small bits of tissue beyond the ligature to continue their functional activity. Very much the same relation exists between the uterus and the ovary as it does between

the uterus and the breast. If we remove the uterus functional activity of the breast ceases, because conception ceases; but the mammary gland acts when the uterus is carrying the fœtus. It begins to develop and it reaches its full activity after delivery, and is then kept up by the action of the child.

The nerve spoken of is merely a conductor and not an individual agent. It will act when the ovarian stimulus is present, and that stimulus may come from a stump of the same nerve, as in the case of the man whose arm is amputated at the shoulder, and he feels pain in the absent finger, so will the same ovarian nerve react and carry intelligence to the nerve centres which convey the same stimulus to the uterine nerve. But the uterine nerve in itself is powerless without ovarian activity.

AN EXPERIMENTAL STUDY OF INTESTINAL ANASTOMOSIS.

By John D. S. Davis, M.D.,
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The conclusions here given are formed after an experimental investigation of every method of anastomosis, and many trials with rubber rings, rubber plates, decalcified bone plates by Senn, catgut rings by Abbè—used in my experiments before the publication of Dr. Abbè's paper on Anastomosis, solid catgut rings, catgut mats, and catgut plates.

My remarks will refer briefly and especially to anastomosis as suggested by Maisonneuve, and made practicable by Dr. Senn with his decalcified bone plates, and not to the various practicable and acceptable *aid to stitch* operations, by means of catgut rings in circular enterorrhaphy, etc., for the restoration of the intestinal continuity.

"Obstruction of the bowels presents itself in two general forms—acute and chronic." The condition of the patient in the acute form is always perilous, and a long operation will only increase the shock and collapse to a fatal result.

It is equally as important to adopt, in cases of chronic obstruction, an operation which can be quickly performed and which is anatomically practicable from stomach to rectum—the presence of tumors, aneurisms, congenital occlusions, strictures of specific or benign origin of the rectum, and sigmoid flexure are just causes for colotomy. Anastomosis can be applied to every part of the intestinal tract.

My adhesive experiments, which play no small part in the consideration of anastomosis, are introduced to convey accurate

knowledge as to the time for adhesion and healing of the approximated intact serous surfaces to take place.

The main objects of these experiments were not to establish new principles or show favorable statistics, but for the purpose of studying the advantages of catgut tissue as a factor in the mechanics of intestinal anastomosis.

My experience includes many experiments on dogs, and two applications to the human subject of catgut mats and plates.

The animals operated on were submitted to no treatment before or after operations, beyond a hypodermic of morphine after the operation, to allay pain; diet was not restricted, the animals being freely fed on bones, meat, vegetables, etc.; used commercial chloroform exclusively as an anæsthetic; the abdomen was shaved, well washed, and properly disinfected with a solution of corrosive sublimate; used antiseptic sponges; fecal extravasation was guarded against by compressing the bowel on each side (the stomach excepted) by aseptic strips of gauze, applied by perforating the mesentery with an ordinary forceps at points not supplied with visible bloodvessels, and tied in loops with sufficient firmness to obstruct the lumen of the bowel.

When partial or complete exenteration was necessary, the intestines were protected by coverings of warm, antiseptic towels wrung out of hot water. Drainage was not resorted to. The peritoneum, as a rule, was closed by a continuous catgut suture; the abdominal opening closed by deep, interrupted sutures of silk; a dry dressing of iodoform and boric acid applied over the wound, and a compress of cotton retained by a many-tailed bandage completed the dressing.

In selecting absorbable material for approximation devices, the importance of accurate knowledge of the time necessary for its absorption, and the time necessary for protective adhesions and definite healing of intact serous surfaces, cannot be too much emphasized. Hence, I will review some of the remarks and conclusions of Dr. Senn on adhesion experiments, not that I think they are not well known

and understood, but simply to recall them to mind for study; and that a clear conception may be had of the terms "adhesion" and "healing," and of the time necessary for perfect healing of coapted and agglutinated serous surfaces. So exact were the experimental investigations of Dr. Senn that it seems like presumption to invade this field with an attempt at anything more definite or conclusive. Yet the subject is far from being exhausted, and its further careful investigation will fortify the practice of anastomosis, confidently recommended as harmless, and indispensable to perfect results, in the restoration of the injured bowel to its functional and structural integrity, and lead to the greater likelihood of the employment of digestible and absorbable material for the approximation devices.

Dr. Senn says:[1] "Adhesion precedes the process of definite healing, but implies simply the presence of an adhesive or cement substance between the serous surfaces, which mechanically agglutinates the parts, while definite healing includes all the processes which take place during the cicatrization. . . . Adhesions between serous surfaces take place by the exudation of plastic lymph, which acts the part of a cement material; while on the other hand, the process of definite healing is initiated by cell proliferation from the pre-existing endothelial and connective tissue cells, and the formation of a network of new bloodvessels springing from each of the coapted granulating surfaces. . . . In suturing an intestinal wound, or in making a circular enterorrhaphy, it has always, heretofore, been deemed necessary not to injure the peritoneum unnecessarily, for fear that such injuries would result deleteriously by interfering with prompt union between the sutured surfaces.

"It is a well-known fact in surgery that approximation of intact serous surfaces does not result in the formation of adhesions. When the surgeon desires to secure union between serous surfaces, he resorts to mechanical or chemical irritation,

[1] Intestinal Surgery. By N. Senn, M.D., Ph.D. Pp. 199–212.

for the purpose of inducing a circumscribed plastic peritonitis, which invariably results in adhesions and obliteration of the serous space." "Reasoning from this analogy," says Dr. Senn, "I was induced to study the effects of traumatic and chemical irritation in hastening adhesions and cicatrization between opposed serous surfaces."

His experiments, which were confined to dogs, were concluded with the following propositions:

1. (31) "Definitive healing of an intestinal wound is only initiated after the formation of a network of new vessels in the product of tissue proliferation from the approximated serous surfaces."

2. (32) "Under favorable circumstances quite firm adhesions are found within the peritoneal surfaces in six to twelve hours, which effectually resist the pressure from within outward."

3. (33) "Scarification of the peritoneum at the seat of coaptation hastens the formation of adhesions and the definite healing of the intestinal wound."

I do not think that a study of the recorded experiments of Dr. Senn[1] will justify the second proposition as abundantly conclusive. Whereas I shall object, as practicable, to the short time of six hours for protective adhesion, I wish to say that in so far as my objections refer to the dangers of unaided adhesions of six and twelve hours, I consider the aided adhesions of two hours quite as competent to resist the pressure from within outward.

This is no admission, however, of the correctness of the conclusion referred to, as satisfactory or practically safe when unaided by the steady, firm pressure of the approximation plates.

It is true that adhesions readily take place in coaptated serous surfaces when denuded of their endothelial coverings, but it is misleading to inform the inexperienced surgeon that such adhesions are strong enough, at six hours, to resist a

[1] Intestinal Surgery, by Senn. Pp. 199–212. Transactions Ninth International Medical Congress, vol. i. pp. 478–486.

pressure from within outward; and, unaided by pressure from plates, prevent the escape of intestinal contents into the peritoneal cavity. Indeed, I can see where much harm may come out of an application and too great a reliance on that idea.

In gastro-enterostomy it is unwise to expect an adhesion of twelve hours, unaided by plate pressure or support, to resist effectually the pressure from within, notwithstanding quick adhesions of coaptated peritoneum are often observed in abdominal work.

I witnessed an operation, in 1886, on a boy, fourteen years of age, for gunshot wound of the abdomen, one and one-half hours after the accident. Exactly two hours after the injury was received I found a two-inch abrasion on the convexity of the jejunum, due to the passing bullet, covered by adherent omentum. I detached the omentum, to be sure that my conclusion was right, and my previously formed opinion, as to the early plastic adhesion, was verified.

At another time, in 1887, while spending one and one-half hours in an examination and reparation of the intestinal tract from injuries due to gunshot wound of the abdomen, the omentum was pressed up against the anterior surface of the stomach for one and a half hours. The serous covering of the anterior surface of the stomach had been brushed by a shot, which denuded it sufficiently to allow the escape of lymph. The omentum, resting against this raw surface, became sufficiently adherent, in less than two hours, to be supported by the adhesion.

A few years ago I did a laparotomy for peritonitis and obstruction of the bowel, near the ileo-cæcal region, from invagination. The invagination was reduced and the peritoneal cavity cleansed by soft sponges and hot water.

After thoroughly washing out the abdominal cavity and dressing the wound, I found that a sponge was missing; and, fearing it was in the abdominal cavity, I reopened the abdomen to look for the sponge (which was not present, as it had been dropped into a slop bucket by a careless assistant), and

found, in one hour's time, the numerous approximation folds of the intestines in the ileo-cæcal region slightly agglutinated by multiple adhesions. The serous surfaces of the intestines were largely deprived of the endothelial covering by the suppurative process, and the washing out of the abdominal cavity was followed by a copious exudation of plastic lymph, which, like a cement substance, mechanically agglutinated the coaptation folds of the intestine in one hour.

Recently I did a laparotomy three days after the symptoms of a rupture of a perityphlitic abscess with general peritonitis, with the hope that I might find a condition less serious than I had diagnosed, and amenable to treatment. The peritoneal cavity was thoroughly cleansed by soft sponges and hot water. Death resulted five hours after the operation. Examination after death revealed universal adhesions of the abdominal viscera. If a pint of mucilage had been poured over the intestines, the agglutination would not have been more general.

These and other such observations taught me that the more thoroughly the peritoneum is denuded of its endothelial covering, the more abundant is the lymph supply and the quicker adhesions take place.

It is true, without seeking to draw illustrations or make applications here, that if the serous surfaces of the intestines are firmly compressed together, union by plastic adhesion will, after a short time, take place, and result finally in complete healing. But that adhesion and complete reparation by cicatrization will result, if not more uniformly favorable, much quicker, by depriving the coaptation surfaces of endothelial covering, is not only a conclusion warranted by experimentation, but the result of my casual observation in general reparative intestinal surgery.

ADHESIVE EXPERIMENTS.

In these experiments, made for the double purpose of testing the absorbability of catgut mats, and to study the advantages of mechanical irritation by scarifying and denuding of the coaptation serous surfaces of the intestine, the serous sur-

faces of the bowel were held in contact by approximation catgut mats. As a rule, only the lateral coaptation threads were provided with needles with which to transfix the lateral margins of the wounds, to prevent ectropium of the sides of the wounds.

In several operations all the threads were provided with needles with which to pierce the intestinal wall, a very good thing to do when the openings, by carelessness or accident, are made a little too large for the oval openings in mats. The mats are thereby prevented from slipping.

Experiment I.—Double ileo-ileostomy by means of catgut mats. The ileum was looped and button-holed at two points in each of the coaptation loops.

Intact serous surfaces No. 1 were scarified by means of an aseptic needle; and intact serous surfaces No. 2 were completely denuded of endothelium by means of a sharp aseptic curette.

Accurate coaptations were made by tying the coaptation sutures and pushing the ends of the sutures in between the coaptated surfaces until completely hidden by the projecting approximated serous surfaces.

Dog killed two hours after operation and wounds examined. Slight effusion of blood between serous surfaces of No. 1, and slight deposit of lymph mixed with blood at No. 2. No leakage under forcible hydrant pressure at the points of operations, on account of the accurate, firm, and equable pressure secured by the approximation mats. A strong evidence of the reliability of the catgut mats in securing uniform coaptation of the approximated serous surfaces.

Time: two hours.

Experiment II.—Triple ileo-ileostomy. The ileum was flexed at equidistant points of six inches, so as to do an anastomosis at three points. At the highest operation, No. 1, the serous surfaces were undisturbed; at the middle operation, No. 2, the serous surfaces were scarified; and at the lowest operation, No. 3, complete denuding was done.

1. No lymph, and no engorgement of coaptated surfaces.
2. No lymph, some blood.

3. Some lymph, some engorgement.

Time: three hours.

Experiment III.—Triple ileo-ileostomy. Ileum flexed at three points, twelve inches apart; openings in bowel equal to size of the gut calibre; coaptation by means of approximation catgut mats. The intact serous surfaces were numbered 1, 2, 3, respectively. No scarification, scarification, and denuding of intact serous surfaces.

1. No lymph, except at the punctures of lateral coaptation sutures there was a slight deposit of lymph.

2. Blood-clot and lymph; intact serous surfaces slightly but irregularly agglutinated.

3. Abundance of lymph deposit; adhesions uniform.

Catgut mats unaffected.

Experiment IV.—Gastro-enterostomy and double ileo-ileostomy. In operation No. 1 the omentum was pushed to one side and the stomach drawn forward into the wound; made a longitudinal incision near the middle of its anterior surface, and a similar incision was made at the junction of the duodenum with the jejunum. All the sutures of the mats in this operation were armed with needles and passed through the entire thickness of the walls of the stomach and the intestine. The lower lateral sutures were tied first, the threads cut short, next the sutures corresponding to each angle, and, lastly, the upper lateral. No scarification at No. 1; operations Nos. 2 and 3—ileo-ileostomies—were performed by flexion and coaptation. Scarification of intact serous surfaces at No. 2 operation, and denuding of the intact serous surfaces at No. 3 operation, over an area corresponding to the size of the mats. Results as in Experiment III. Mats unchanged.

Time: four hours.

Experiment V.—Gastro-enterostomy, ileo-ileostomy, and ileo-colostomy. Each approximation was made by means of catgut mats, and the intact serous surfaces treated in the regular order of 1, 2, 3, without division of bowel.

1. Plastic lymph; slight adhesions around the perforations for sutures.

2. Lymph and blood; adhesions uniform.

3. Lymph in abundance; some blood; adhesions much firmer

than in No. 2. Mats not affected. Coaptation was perfect, without outside safety sutures.

Experiment VI.—Triple ileo-ileostomy, with divisions of the bowel. The six open ends of the ileum were each closed by continuous silk suture. Lateral coaptation by means of catgut mats with the regular order of treatment of intact serous surfaces. Adhesions between intact serous surfaces about as in Experiment V. Omentum was attached to divided ends of Nos. 2 and 3, to one end of No. 1, and approximation of No. 3. In all three of the operations in this experiment the mesentery was trimmed back a half inch from the end, and the invagination made by means of toothed forceps, with which the lips of the bowels were seized and carried into the lumen. The ends were held by the left index finger and thumb while being closed by a quick continuous suture. The closure was effectually made without the mesentery turning in after the edges of the bowel, and left a raw surface, to which the omentum became attached. The denuding was extended over a greater area than covered by the mats in No. 3, which was the cause of the last omental attachment.

Experiment VII.—Triple ileo-ileostomy, without division. Adhesion process about as in Experiment V. No omental attachment. Mats in good condition.

Experiment VIII.—Gastro-enterostomy. A two-inch longitudinal incision was made in the anterior surface of the stomach; a similar incision was made in the jejunum; denuded serous surfaces; catgut mats were introduced into each wound; the margins of wounds were punctured by the armed sutures; the two wounds were brought *vis-a-vis* and the sutures tied.

Plastic lymph in abundance; adhesions uniform and quite firm. Mats unchanged. Hydrant pressure ruptured the peritoneal covering of the stomach near the pyloric orifice, without causing leakage from the wound.

Time: six hours.

Experiment IX.—Double gastro-enterostomy and ileo-colostomy without division. Two openings were made in the anterior surface of the stomach, one near the pyloric and one near the cardiac orifice, and the jejunum was opened to correspond. The ileum, near the ileo-cæcal valve, was incised and the ileum united by catgut mats through a similar opening in the ascending colon. All three of the intact serous surfaces were treated in their regu-

lar 1, 2, 3 order, and approximated by means of catgut mats. In these approximations the lateral sutures only were armed with needles for puncturing the lateral margins of the wounds.

1. Slight adhesions by a scanty deposit of lymph.

2. Lymph more abundant, and the adhesions three times as firm as in No. 1.

3. Adhesions very firm, approximately twice as firm as in No. 2.

Mats unchanged.

Time: twelve hours.

Experiment X.—Triple ileo-ileostomy by approximation catgut mats. The bowel was looped, and three fistulæ were formed between the two adjacent loops of the intestine, about four inches apart.

In operation No. 1, simply approximation of serous surfaces; in operation No. 2, the intact serous surfaces were scarified; in operation No. 3, the serous surfaces were denuded by scraping the serous membranes with a knife.

1. Coaptated serous surfaces were covered with a thin layer of plastic lymph, which agglutinated the intact folds; serous surfaces very vascular.

2. Adhesions very much firmer than in No. 1; serous surfaces agglutinated beyond the area corresponding to approximation mats.

3. The adhesions confined to area of mats, but firm.

On separation of adhesions, I found the serous surfaces at No. 1 cemented together by plastic lymph; at No. 2, vascular, rough, and largely deprived of endothelial covering; at No. 3, forcible separation produced a longitudinal tear of the peritoneum on the convex surface of the approximation fold, and laceration of the peritoneal and muscular coat at the mesenteric coaptation.

Time: twelve hours.

Experiments XI., XII., XIII., and XIV.—Each of the four experiments was a triple ileo-ileostomy, as in Experiment X. The results, in regular order, were as follows:

1. Adhesions firm, intact serous surfaces easily separated.

2. Adhesions firm; endothelial covering destroyed.

3. Adhesions very firm, and, with one exception, could not be separated without producing lacerations at the point of operation.

Unfortunately, in Experiment XIII., the mats and coaptation threads had not been rendered aseptic, and gave rise to local septic peritonitis, which, in eighteen hours, had not rendered the approximation incompetent, but had prevented the process of adhesion, and impaired the natural process of reproductive changes.

Time: eighteen hours.

Experiment XV.—Triple ileo-ileostomy, as in Experiment X. The dog was small, and the coaptation mats were large. Perforation and leakage at No. 1. Septic peritonitis had begun, and would have soon destroyed life. Adhesions firm at No. 2, though the coaptation serous surfaces were easily separated. At No. 3 adhesions firm and unyielding. Mats a little softened.

Time: twenty-four hours.

Experiment XVI.—Triple ileo-ileostomy without division. The ileum was looped, and three fistulæ were made by means of approximation catgut. Mats, as in Experiment X.

1. Adhesions firm.
2. Adhesions firmer.
3. Adhesions could not be separated.

Experiment XVII.—Triple ileo-ileostomy by looping the intestine at three points, and forming the fistulæ by means of catgut mats, with the following results:

1. Intestines agglutinated at point of operation, but not competent to resist the pressure from within outward, without the aid of the approximation mats.
2. Adhesions firm and competent, without aid from the mats, to resist the pressure from within outward.
3. Firm adhesions; exudation tissue supplied with blood-vessels.

Mats very soft. At No. 1 adhesions separated under hydrant pressure; No. 2 gave way under hydrant pressure, with numerous rents in the proliferation tissue and peritoneal covering of the bowel near operation; No. 3 competent and unyielding to hydrant pressure.

Time: forty-eight hours.

Experiment XVIII.—Gastro-enterostomy by means of catgut mats. Fistula, equal to calibre of jejunum, made between anterior surface of stomach and middle of jejunum by means of approximation catgut mats. No scarification of coaptation surfaces.

Continuous suture, with fine silk, was made around the coaptated serous surfaces. Mats absorbed away.

I do not think the adhesions strong enough to have held, but for the precautionary outside suture.

Experiment XIX.—Gastro-enterostomy. Scarification of coaptation surfaces. Coaptated anterior surface of stomach with jejunum by means of catgut mats. Applied, on outside, continuous suture. Mats intact, but soft, and gave no protective support. Adhesions strong enough to protect the bowel, regardless of the outside suture.

Experiment XX.—Gastro-enterostomy, denuded intact serous surfaces, coaptated anterior surface of stomach with jejunum, by means of approximation catgut mats, forming a fistula equal in size to the calibre of the jejunum. No outside safety sutures were applied. Mats almost detached. Wound healed. Fistula lined with mucous coat.

Time: sixty hours.

Experiment XXI.—Gastro-enterostomy; also ileostomy, ileo-colostomy, as in Experiment V.

1. Adhesions firm and unyielding. Mats absorbed away. One lateral coaptation suture hung in lower lateral margin of fistula.

2. Adhesions firm and unyielding. Mats intact, but soft.

3. Adhesions firm and unyielding. Mats intact, but soft, and gave no support.

Experiment XXII.—Gastro-enterostomy, ileo-ileostomy, and ileo-colostomy, as in Experiment V.

1. Union firm and unyielding to hydrant pressure without peritoneal lacerations. Mats absorbed away.

2. Union complete against hydrant pressure. Mats very soft, but intact.

3. Cicatricial union competent to resist hydrant pressure. Mats very soft, but in place.

Experiment XXIII.—Repetition of Experiment V. Condition of mats found to be as in Experiments XXI. and XXII.

Time: seventy hours.

Experiment XXIV.—Double ileo-ileostomy by division and denuding of intact serous surfaces. Mats very soft and partially detached in upper fistula.

Experiment XXV.—Double ileo-ileostomy by looping the

bowel and denuding the intact serous surfaces. Mats very soft, and gave no support. Fistulæ were lined with mucus.

Time: eighty hours.

Experiment XXVI.—Ileo-ileostomy and ileo-colostomy, without division by means of catgut mats. Coaptation serous surfaces denuded by means of a knife. Mats absorbed away. The lateral coaptation threads in fistulæ.

Experiment XXVII.—Ileo-ileostomy by flexion and coaptation with catgut mats. Excision of six inches of intestine containing the anastomotic operation and ileo-ileostomy repeated by means of catgut mats with the ends of the closed bowel looking in opposite directions. Mats were absorbed. Coaptation threads all gone. The specimen removed, which I here show, is completely healed by granulation at point of anastomosis.

Experiment XXVIII.—Ileo-ileostomy (the second operation referred to in Experiment XXVI.). Mats absorbed. Coaptation stitches all gone. Wound entirely healed. Made exsection and third anastomosis by means of catgut mats. (See Experiment XXIX.)

Time: eight days.

Experiment XXIX.—Ileo-ileostomy. Third laparotomy for anastomotic purposes on this dog. The dog used in Experiments XXVII. and XXVIII. was operated on for the purpose of removing the section of ileum containing second fistula, eighty hours after second laparotomy, and one hundred and sixty hours after first laparotomy. Coaptation was made by means of catgut mats with the closed ends of bowel looking in opposite directions. Intact serous surfaces denuded. Dog was killed with commercial chloroform eight days after the third anastomotic operation was performed. Wound healed. Mats and threads gone. The specimens removed at eighty hours and eight days show but little difference in the process of tissue proliferation and cicatricial healing.

Experiment XXX.—Ileo-ileostomy, with division and lapping six inches. Healing complete. Mats and threads gone. No collection in overlapped ends of intestine.

Experiment XXXI.—Ileo-ileostomy, with division by means of catgut mats. The divided ends were turned in and closed by continuous silk sutures. The proximal end was brought down and incised ten inches from end; the distal end incised in the

same manner. Coaptation serous surfaces denuded. Approximation by means of catgut mats. Dog killed on the eighth day. No collection in distal end. Some hair and fæcal matter in proximal end. No distention, no catarrh. The coaptation, ten inches from extremities in this case, was made to see if the excluded ends would be a source of danger on account of collection of intestinal contents.

Experiment XXXII.—Ileo-ileostomy, with overlapping of ten inches of proximal and distal ends. Distal end empty; proximal end not empty, but contained nothing to irritate. Wound healed. Fistula lined with mucus. Mats gone.

Comments.—In these experiments it was aimed to study the advantages of mechanical irritation by interrupted lacerations of the serous covering of the bowel, and complete traumatic denuding of the approximation surfaces of the intestine.

Accurate observation was made in each experiment, and the results support the conclusion that the more perfect the denuding of the coaptation serous surfaces, the quicker and perfect will be the process of adhesion and final healing. A fact of practical importance to the surgeon in operations on the intestinal canal.

Traumatic irritation by scarification of the peritoneal surfaces with the point of an aseptic needle, is not so potent a means to provoke a circumscribed plastic peritonitis as the traumatic destruction of the endothelial layer by means of an aseptic knife or curette. The latter is followed by immediate copious exudation of plastic lymph, which, in the former, is deferred several hours, and mechanically agglutinates the coaptation serous surfaces. Definite healing in the latter begins in twelve hours, and in the first in twenty-four hours.

It is hazardous to risk a coaptation by means of catgut mats, without scarification or denuding the intact serous surfaces, as the mats absorb away before definite healing begins. Additional protection, however, may be secured by outside safety sutures, which will hold the agglutinated surfaces together until definite healing takes place.

With scarification of intact serous surfaces, definite healing

begins in twenty-four hours, and offers perfect protection in forty-eight hours.

With complete denuding of the endothelial covering, definite healing begins in twelve hours, which is competent in eighteen to twenty-four hours to give protection.

INTESTINAL ANASTOMOSIS.

In a number of pathological conditions of the intestinal canal, as in gangrene, gunshot wounds, multiple strictures, of benign and specific origin, it may become necessary to resort to extensive resection or physiological exclusion, with anastomosis as a ready means of restoring the intestinal continuity. As a rule, however, no portion of the intestinal tract should be removed be excision when, by lateral approximation and physiological exclusion, it can be retained without direct injury to the patient. Of course, in multiple gunshot wounds, where the wounds are large, in close proximity, it may become necessary to resort to extensive resection. Yet, if the bowel can be divided above the seat of injury; the ends closed by continuous sutures; the lacerations and openings in the bowel from gunshot closed, even at great expense of the cut calibre, and the integrity of the bowel restored by lateral approximation, by means of catgut mats or plates, it will be far better (as accumulation of feces will not take place in the excluded distal end of the bowel) than to risk the immediate consequent dangers of traumatism from excision.

The traumatism will be "proportionate to the length of the piece of intestine removed; the remote consequences are due to the impairment of the function of digestion and absorption, caused by the shortening of the intestinal canal." It must be remembered that in such extensive multiple gunshot wounds the traumatism is already great, and the immediate danger, in consequence of the existing traumatism, makes it impossible to remove so much of the intestinal tract as would be in keeping with the function of digestion and absorption, even as could be done for the relief of chronic pathological troubles.

This is an observation, the result, not of theoretical conclusion, but based on personal experimental investigations on animals.

Kœberlé, Kocher, and Baum have successfully removed respectively 2.05 millimetres, 160 centimetres, and 137 centimetres of the small intestine in the human subject.

Two of the patients suffered no ill effects in consequence of the removal of such large surfaces for digestion and absorption. In Baum's case, death supervened six months after the operation, from marasmus, brought about by the extensive intestinal resection. However, the admission of the success of Kœberlé and Kocher does not rebut the objection to the operation of excision when the surgeon is enabled to resort to an operation that will save the intestinal tract and avoid the long time necessary to do a circular enterorrhaphy. Circular enterorrhaphy, under most favorable circumstances, when done by Senn's modification of Jobert's invagination suture or by catgut ring approximation, which possesses the advantages of confrontation of the resected ends of the intestine[1] by means of aseptic approximation catgut rings, cannot be a favored operation to anastomosis (notwithstanding the improvement in technique[2]), as it would necessitate removal, in a very large majority of cases, of the injured or diseased portion; while, with the anastomotic approximation, the diseased portion of the intestine may be allowed to remain and carry on its function of digestion and absorption.

By retrostalsis the ingesta is carried up from the fistulous communication into the excluded intestine, where the normal function, though to a small extent, in part may be resumed and its physiological function continued.

The technique of circular enterorrhaphy has been much

[1] Circular Enterorrhaphy by Means of Catgut Rings; Lumina of Unequal Size Corrected by Oblique Division of Distal End, at the Expense of the Convexity of the Intestine; report of experiments. By John D. S. Davis. Read before the Jefferson County Medical Society.

[2] On Circular Enterorrhaphy, and its Rapid Performance with Easily Improvised Catgut Rings. By Rudolph Matas, M.D. Transactions of the Louisiana State Medical Society, pp. 345–358.

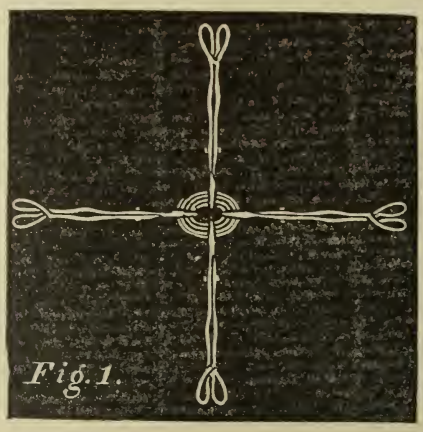
simplified by aiding the stitch operation with approximation catgut rings, but not sufficiently so to place it on the easy level of anastomosis by lateral approximation, etc. It is yet difficult to execute, and not devoid of dangers. So it does appear proper and rational to give the patient the benefit, where possible, of an operation that is mechanically clear, easy of execution, and always available, on account of the readiness with which the approximation catgut mats and plates can be had.

I will now show my approximation anastomotic devices, which, alone, will illustrate to you the fallacy of objections to the introduction of absorbable aseptic coaptation material into the intestinal tract for anastomotic purposes.

DESCRIPTION FOR MAKING CATGUT MATS.[1]

For making a small-sized mat with an oval opening of six-eighths of an inch by one-third of an inch, begin by taking

Fig. 1.



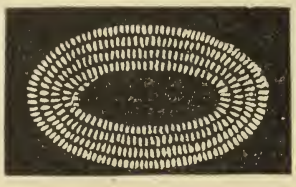
exactly one foot of a large, raw, catgut thread, the size of a counter catgut violin string. Place it in hot water for two minutes, until it thoroughly untwists itself; then wind the

[1] Virginia Medical Monthly, September, 1889, p. 457

same upon itself so that the fourth layer completes the one foot. This frame or ring is then firmly clasped by four pairs of catch-artery forceps, one at each end and side; at the same time pulling the ring or frame out into an oblong shape (see Fig. 1). The weaving is then begun by means of a needle armed with a small, green, catgut thread, taking care to mat or weave the sides first, in order to fix the oblong shape.

The suture is carried alternately over and under each rib, making the stitches as close together as possible—continuing thus around the entire ring until the mat is complete, care being taken to flatten each of the ends of the rib in order to make the mat at this point correspond in size and width with the remainder (see Fig. 2). When the mats are made of the

Fig. 2.



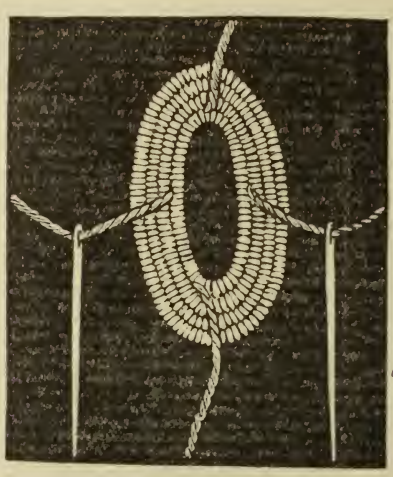
raw catgut in the above way they may be made absolutely aseptic by placing them for a half hour in a 1 per cent. alcoholic solution of corrosive sublimate, to which has been added 5 per cent. of tartaric acid. They should then be placed on a cloth, wrung out of 1 to 1000 watery corrosive sublimate solution, until they have dried. They are then transferred to, and kept permanently in, a 5 per cent. alcoholic solution of carbolic acid.

When it is desired to employ them they are wiped in a towel which has been soaked in a 1 to 1000 watery solution of corrosive sublimate, and placed for one-half hour in a 1 to 1000 alcoholic solution of corrosive sublimate.

While I prefer the catgut mats made from the raw catgut, as described, as superior to any other, it is sometimes necessary, for want of time, to prepare the mats at the time set for oper-

ating, when they may be made with ease and rapidity from the ordinary chromated catgut found in the shops. The latter requires a little longer time for absorption, but answers the

Fig. 3.



purpose admirably. The coaptation sutures of braided silk are fixed by simply passing a needle and thread between the two middle, or, when small, between the two inside ribs, and so returned as to loop two or three of the small catgut sutures used in weaving the ribs together (see Fig. 3). No amount of flexion and contortion will destroy their integrity when made from either form of catgut.

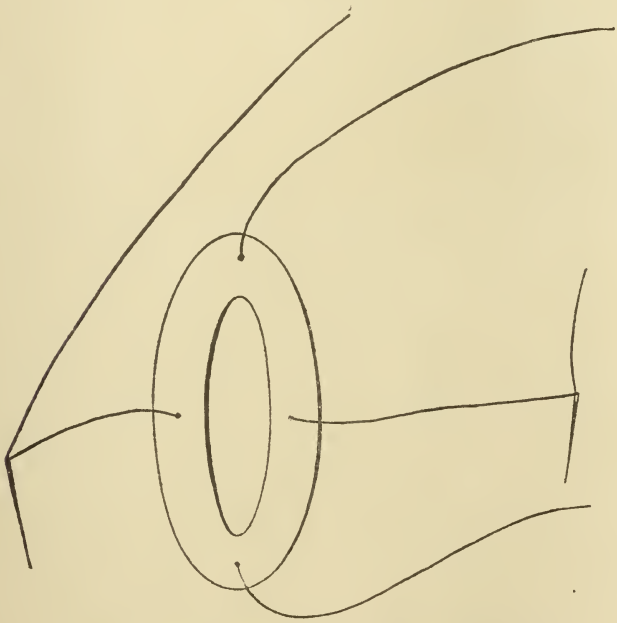
When doing a gastro-enterostomy it is necessary to have the frames made from a larger catgut violin string, double the size of the ordinary counter violin string used for making the frames of mats to be used elsewhere in the intestinal tract, owing to the protection necessary against the ready action of the gastric fluid. In these plates the coaptation threads should include the second inside rib, to give greater security and permanency to the coaptation. While I have met with no failure in the other method of the attachment to the intra-gastric mat,

I would not do the operation on man without resorting to this extra precautionary safe attachment to one of the ribs.

DESCRIPTION FOR MAKING CATGUT PLATES.

The catgut plates are made for me by Messrs. Johnson & Johnson, of New York City. The uncut green gut tissue is made into compressed plates, one-eighth to one-sixth of an inch thick, and twelve by six inches wide, and dried. From this large plate sheet the perforated oval approximation plates are made by cutting them out with an ordinary knife, with a small blade. The small perforations for the coaptation sutures are

Fig. 4.

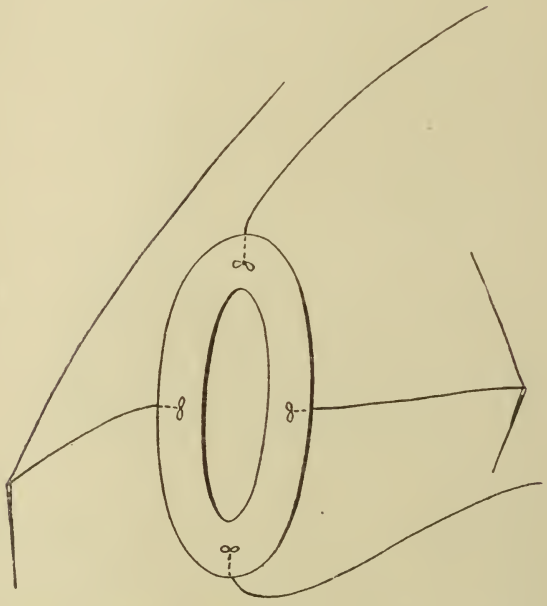


Approximation catgut plate and coaptation threads.

made by piercing the plates at four points with an awl. The coaptation threads are passed by means of a needle and secured by doubling the end of the thread and making an ordinary knot in it (see Figs. 4 and 5). When the threads are properly

fixed they cannot be drawn through the holes. Finally, when the plates are absorbed away, the threads are simply drawn out by the last and most resisting plate, and carried away with it.

Fig. 5.



Approximation catgut plate, showing knots for holding coaptation threads.

The plates can be cut out in any size, and the threads fixed, ready for use, in ten minutes. Messrs. Johnson & Johnson have written me that they will soon have steel punches, of two sizes, for making the plates ready for the market.

Until the punches are made, the sheet plates may be had of Messrs. Johnson & Johnson, from which any surgeon can easily make his own approximation plates.

Catgut plates are more easily made than any other device yet introduced, to approximate the serous surfaces of the bowel in anastomosis and some other operative procedures, for restoring the bowel to its structural integrity.

The plates are oval, with an oval opening greater than the

transverse diameter of the plates. Hence, it is an easy matter to apply the plates through an incision equal in size the oval openings in plates. (See Fig. 6.)

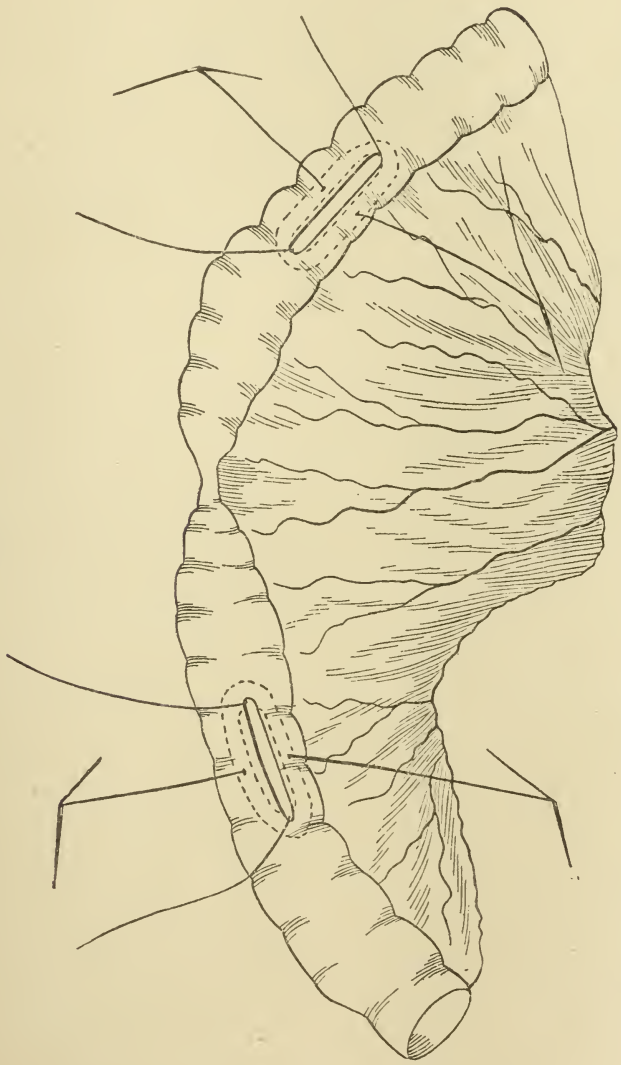


Fig. 6. Catgut plates applied to ileo-ileostomy, without division, before tying together. Dotted lines represent size of plates.

Perhaps there has been no subject more discussed in this and foreign countries the past few years than the means neces-

sary to restore the functional integrity and structural continuity of the intestinal canal. Unfortunately, however, there has been a constant squinting at the practice of introducing anything foreign into the intestinal canal, regardless of the unquestioning confidence in the infallibility of the material used, and the dazzling brilliancy with which the anastomotic operations can be performed.

The operation can no longer be looked upon as an absurdity, notwithstanding a number of eminent medical men manifest an apparently uncontrollable tendency to imitate, instead, any procedure that favors the restoration of the intestinal continuity unaided by mechanical appliances, rather than accept as legitimate the aided stitch operations, by means of absorbable aseptic, non-irritating materials, made with rings, mats, and plates. I fear, therefore, that our monkey habit of imitation will not prevail in the ready adoption of this simple and easy anastomotic procedure as it deserves, notwithstanding its successful, though limited, application to man. Be that as it may, the mechanical principle is so clear, the method so practicable, and the application so much easier than circular enterorrhaphy, lateral apposition by suturing, and plastic operations, that the advantages can but finally appeal to every surgeon.

The integrity of catgut mats has been illustrated to you incidentally in the recitation of my adhesive experiments. And now, rather than worry you with a detailed account of every individual experimental application of catgut mats and catgut plates, in gastro-enterostomy, jejuno-ileostomy, ileo-ileostomy, ileo-colostomy, colo-colostomy, etc., I will briefly refer to some of my experiments after I have reported two cases of anastomosis on man—one by means of approximation catgut mats, and one by means of approximation catgut plates.

ILEO-COLOSTOMY IN WHICH CATGUT MATS WERE USED FOR APPROXIMATION.[1]

CASE I.—July 16, 1889, eight o'clock P.M., my brother, Dr. W. E. B. Davis, was called by Drs. Charles and C. T. Drennen to operate on Webster Gary, negro, aged forty-two years, furnace tender, for intestinal obstruction. He found the patient *in extremis;* temperature 101°, and pulse 135. He made a diagnosis of perityphlitic abscess, suppurative peritonitis, and fecal obstruction of the ileum, in the region of the ileo-cæcal valve; and he expressed the opinion that the man would die in a few hours regardless of any operation. He opened the abdomen from the symphysis to midway between umbilicus and ensiform appendix, and found a perityphlitic abscess; general peritonitis, due to rupture of abscess sac; compound flexion of the ileum, bound by strong adhesions in the region of the ileo-cæcal valve, and fecal impaction, accompanied by great distention of intestines above the seat of obstruction.

The abdominal cavity and abscess sac were thoroughly cleansed by irrigations with hot water. The ileum was opened near the point of obstruction, and emptied of nearly one gallon of impacted feces, liquids, etc. A second opening was made at the jejuno-ileum juncture to allow the escape of a large quantity of gas, which was in the upper part of the bowel. These opening were closed by the Czerny-Lembert suture.

At this point in the operation the patient seemed to be holding up well; and to avoid the *necessity* of resorting to the formation of an artificial anus I was requested to do anastomosis by means of my approximation catgut mats, with the view of establishing the continuity of the intestinal canal.

The ileum above the seat of obstruction was brought in contact with the ascending colon below the point of obstruction, by making an incision an inch and a half in length in both intestines at a point opposite the mesenteric attachments, and the visceral wounds carefully united by means of my approximation catgut mats. A catgut mat, to which was fastened four braided silk threads, was introduced through each opening into the intestines. The lateral

[1] Virginia Medical Monthly, September, 1889, pp. 454–460.

sutures were passed through the margins of the wound to prevent ectropium of the sides of the incisions. After the mats and sutures were in place, the wounds were brought in contact, and the four sutures tied, which accurately coaptated the serous surfaces of both bowels over an area corresponding to the size of the mats. This procedure occupied only three minutes. No outside safety sutures were made, as the approximation was perfect, and the coaptation sutures well protected between the approximated serous surfaces. A glass drainage-tube was fixed in the lower portion of the wound, and the peritoneum closed by a continuous catgut suture. The incision in the abdominal wall was closed by interrupted silk sutures, and antiseptic dressing applied.

The time occupied in the whole operation was sixty-five minutes.

The patient rallied nicely, was comfortable, and gave favorable signs of recovery for fourteen hours. Three hours after the operation was completed, the patient had a small fecal operation, when a large quantity of gas passed per rectum. Temperature ten hours after operation 100°, and pulse 120. Fourteen hours after operation, while unattended by the nurse, the patient attempted to get up by himself, and died suddenly from exhaustion.

Necropsy two hours after death.—Abdominal wound united. Omentum adherent to wound at the points of operation and incisions. The anastomosis was perfect, and the new opening sufficiently large nearly to equal in size the lumen of the ileum. Adhesions between the two serous surfaces of the bowel firm, and extended a little beyond the line of approximation, as you can see from this specimen removed during the autopsy.

Whilst this was a desperate case for any operative interference, I am sure this patient's life was comfortably prolonged ten or twelve hours by the opening, emptying, and washing out the abdominal cavity.

JEJUNO-ILEOSTOMY IN WHICH CATGUT PLATES WERE USED FOR APPROXIMATION.

Case II.—George Brown, aged thirty years, was attending a dance at Smithfield, August 11, 1889, and while in a drunken row with another negro, his antagonist shot him twice with a

thirty-two calibre pistol at short range. The injury caused but little pain, and, after the accident, the patient walked about one mile to his home, on Enon Ridge, where he was placed in bed. The shots were received at eight o'clock at night, and Dr. E. M. Blakely saw him at three o'clock in the morning. I saw the wounded man with Dr. Blakely fourteen hours after the injury was received. Patient complained of pain in the abdomen ; pulse 120 and weak ; his general appearance indicated a serious injury. A bullet wound was found one inch above umbilicus, and one and one-half inches to the left of the median line; and two wounds, entrance and exit of ball, one just above the umbilicus and one between the umbilicus and anterior spinous process of ileum. The first ball entered the abdominal cavity, the second passed under the skin and out, doing little harm. Abdomen very much distended, and dull on percussion.

Operation.—Chloroform as an anæsthetic; thorough disinfection of abdominal wall ; laparotomy by median incision, twelve inches in length, from pubis upward. Three pints of fluid blood in the peritoneal cavity, and hemorrhage continuing from the mesenteric veins at five points of perforation of lacerated mesentery, arrested by ligation in mass. Ten perforations were found in jejunum within a distance of ten inches, seven of which were in the mesenteric border, three perforations of mesentery, with a one and one-half inch laceration of mesenteric wall of the jejunum. A perforation of the duodenum was found near the mesenteric attachment, making twelve perforations of the bowel. The opening in the duodenum was closed by Czerny-Lembert suture, and as it was impossible to close all the openings on the mesenteric side of the jejunum—nearly two inches of the mesenteric margin being torn away—I excised ten inches of the jejunum (containing eleven perforations) and its mesentery; closed the ends of the bowels by continuous silk sutures; brought the proximal end down by the distal end, and made lateral coaptation by means of approximation catgut plates, with oval openings nearly as large as the calibre of the jejunum. Denuded intact serous surfaces. One hour and twenty minutes had been consumed in arresting the hemorrhage, closing perforation, making resection, doing a lateral coaptation anastomosis, and thoroughly cleansing the peritoneal cavity. Patient pulseless. Hypodermics of brandy revived the pulse. After the completion of the peritoneal toilet

a glass drainage-tube was introduced in the lower angle of wound, the abdomen closed by interrupted sutures that included the peritoneum, and a dry dressing applied externally. Whiskey and brandy were administered freely (hypodermically) after the operation. Time of operation one and one-half hours. The foot of the bed was elevated and dry heat applied to extremities. Patient rallied a little and died at 5 P.M., from loss of blood. Fifteen hours intervened between the time the injury was received and the treatment by laparotomy.

The operation resorted to in this case illustrates the applicability, feasibility, and superiority, in most cases, of anastomosis over circular enterorrhaphy.

Necropsy thirteen hours after death.—Abdominal cavity clean. Adhesions at the point of coaptation of denuded serous surfaces. The specimen removed is, as you can see, a clear illustration of the perfection and simplicity of the operative procedure.

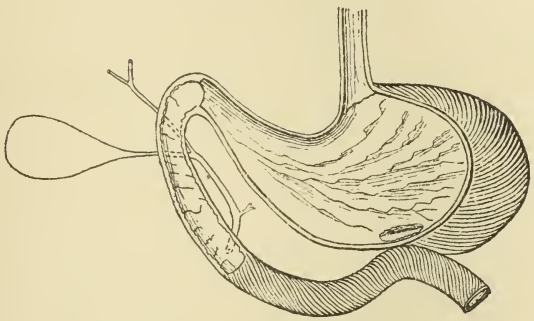
I have here specimens removed from two dogs that will show you the result of an ileo-ileostomy in one and a gastro-enterostomy in the other.

Ileo-ileostomy.—White cur, weight twenty-five pounds. Performed three laparotomies on him for anastomotic purposes. The last operation was done over 128 days ago. Twenty inches of the ileum were excised; the divided ends of the bowel turned in and closed by continuous sutures of silk; lateral approximation, with the ends turned in same direction, by means of catgut mats, tied together (denuding of serous surfaces) by means of silk sutures. The dog has been in good health. Mats were absorbed and never passed per rectum. Beside the specimens from last operation, I have the specimens removed by resection at the time of last anastomotic operation, which is about twenty inches long and contains an anastomosis with division and the ends turned in opposite directions. Seven days intervened between first and second, and second and third operations.

Gastro-enterostomy.—A pointer bitch, weight thirty-one pounds; had only one laparotomy performed on her. Twenty-four days ago I established an anastomosis between the stomach and the upper portion of the intestinal canal without division, as is performed in cases of stenosis of pylorus or duodenum. Omentum

was pushed to one side and stomach drawn forward into the wound; a longitudinal incision was made in the middle of the anterior surface. A similar incision was made in the intestine; catgut plates with lateral approximation threads, armed with needles for transfixing the lateral margins of the wounds, peritoneum denuded over area of plates, were introduced. Coaptation

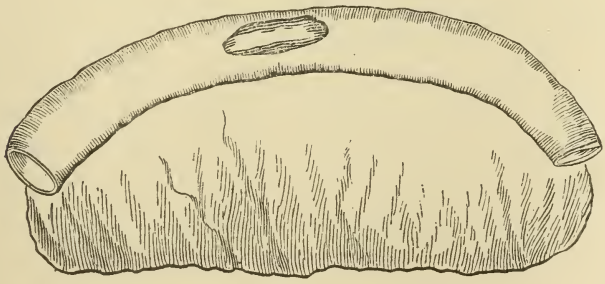
Fig. 7.



Fistula after gastro-enterostomy.

made by tying the approximation ligatures. An outside safety suture was applied to the posterior margin of the coaptation serous surfaces. Nothing has been seen of the plates. The fistulous opening is equal in size the calibre of intestine (see Fig. 7).

Fig. 8.



Gunshot wound of the convexity of ileum.

To illustrate more fully the scope of the application of catgut plates in the restoration of intestinal continuity, it will be necessary to depart from the strict interpretation of anastomosis

—the establishment of a fistulous communication between the bowel above and below the obstruction, etc.—and extend the

Fig. 9.

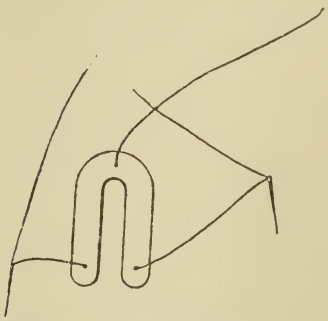
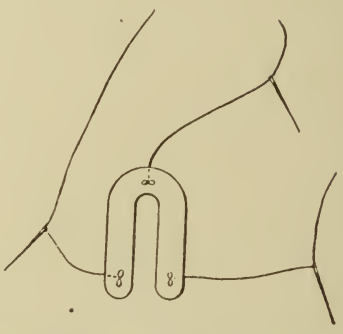


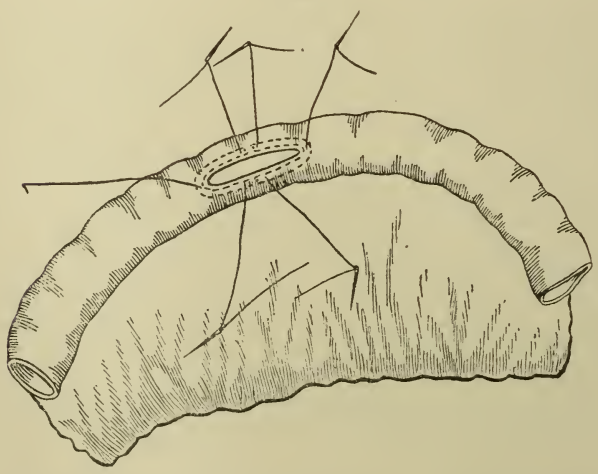
Fig. 10.



Horseshoe plates showing approximation threads armed with needles.

application, which comes within the legitimate sphere of this paper, to the repairment of gunshot injuries where the continuity can be restored without the constriction of gut calibre.

Fig. 11.



Horseshoe plates in position before tying together. Dotted lines represent the plates.

In gunshot wounds of large openings on the convex or lateral sides of the intestine (see Fig. 8), the integrity of the

bowel may be restored by cutting one end out of the plates each, so as to convert them into *horseshoe plates* (see Figs. 9 and 10), and the wound closed in the following manner:

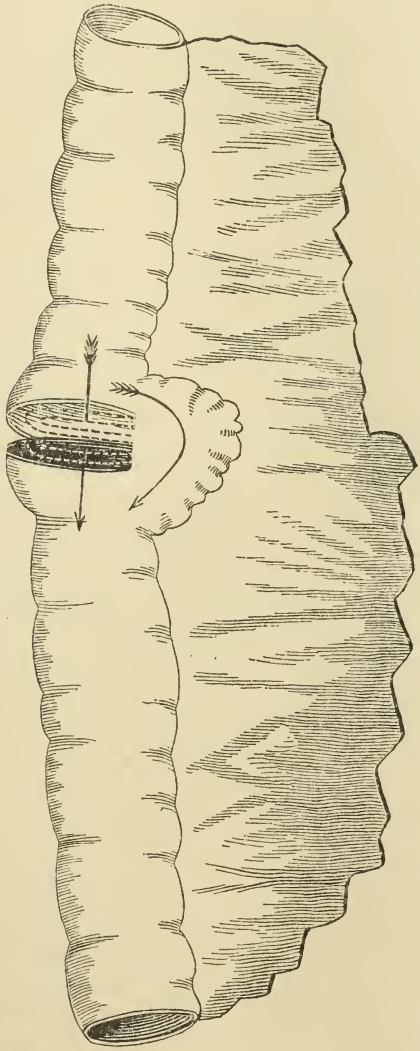


Fig. 12. Horseshoe plates in position after tying together.

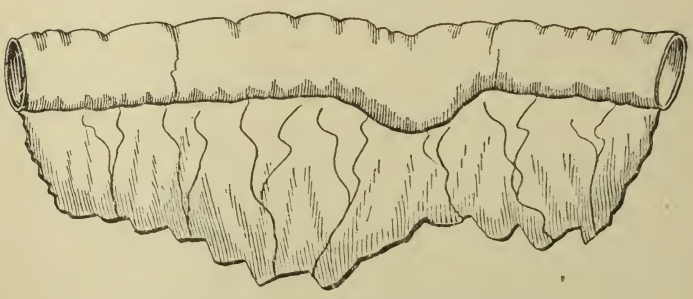
The edges of the wound may, or may not, be trimmed; each of the approximation plates having been deprived of one of its

coaptation threads and converted into a horseshoe, are now introduced into the wound; the coaptation sutures, armed with needles, are made to transfix the angles and margins of the wound in such a manner as to give the plates the hinge appearance before closing (see Fig. 11); the threads are tied, cut short, and pushed in, which completes the operation (see Fig. 12).

The serous surfaces should be denuded before closing the plates and tying the threads. The operation, instead of infringing on the lumen of the gut, increases its calibre at the point of injury.

In the absence of the catgut plates the catgut mats may be utilized in the same operation, but by increasing the size of the wound and letting the mats intrude on the pouched gut calibre. When the wound is healed, the opening will present the same appearance as when done by means of the approximation *horseshoe plates.* (See Fig. 13.) When the coapta-

Fig. 13.



Result of the application of horseshoe plates.

tion is perfect it is unnecessary to apply outside safety sutures, otherwise they add to the security of the coaptation.

Without enumerating the many cases calling for the application of anastomotic approximation catgut mats and plates, or further remarks on their advantages, I beg to leave to suggest the following propositions for your consideration:

1. Approximation catgut mats may be made of any size in less than one hour.

2. Approximation catgut plates may be made of any size in ten to fifteen minutes.

3. Approximation catgut horseshoe plates are very valuable in intestinal repair from gunshot injuries of the convexity of the bowel.

4. Approximation catgut mats and plates absorb away in forty-eight to sixty hours in gastro-enterostomy, and in seventy to eighty hours in operations below the stomach.

5. Anastomosis by means of approximation catgut mats or plates furnishes the best conditions for the healing of visceral wounds.

6. Anastomosis can be performed by means of catgut mats or plates without division of bowel in five minutes, and with division or resection in fifteen minutes, including a continuous outside safety silk suture around the circumference of the mats or plates.

7. Denuding the peritoneum of endothelium at the seat of coaptation hastens the exudation of plastic lymph, the formation of adhesions, and the definite healing of the intestinal wound.

8. When coaptation serous surfaces have been denuded of their endothelial coverings by mechanical scraping with a knife or curette, plastic adhesions readily take place, and definite healing, by the formation of a network of new blood-vessels in the product of tissue proliferation from the coaptation serous surfaces, is initiated in eighteen hours.

INTESTINAL ANASTOMOTIC OPERATIONS WITH SEGMENTED RUBBER RINGS, WITH SOME PRACTICAL SUGGESTIONS AS TO THEIR USE IN OTHER SURGICAL PROCEDURES.

By A. V. L. Brokaw, M.D.,
St. Louis, Missouri.

The future of Intestinal Surgery is indeed encouraging. One after another the many difficult problems are being solved, and conditions heretofore considered so formidable are being reduced to a state of simplicity. It is hardly necessary for me to review the various improved methods of dealing with conditions indicating the performance of intestinal anastomotic operations, or making a rapid and safe resection by means other than the slow, tedious suturing. To obtain good results, time will be found to play a most important part; everything will often depend upon the rapid completion of such operations. The purpose of this paper will be the consideration of intestinal work generally.

For many months I have been experimenting with segmented rubber rings in all the anastomotic operations, and such operations as gastrostomy, cholecystotomy, duodeno-cholecystotomy, jejuno-cholecystotomy, and circular enterorrhaphy. The rings used by me are rapidly made—during an operation, if necessary. All that is necessary is some rubber tubing, or a soft, ordinary rubber catheter, and some catgut. I prefer tubing one-sixteenth to one-eighth of an inch in diameter. A section of this of sufficient length to make a ring of the desired aperture is cut into from four to

eight segments. Passing heavy strands of catgut through the lumen of these pieces, the ends are tied tightly enough to bring the ends of all the segments together, forming an oval ring. To the catgut strands are tied from four to six silk apposition threads, twelve to fourteen inches long, and the attachment of needles to these threads renders the ring ready for use. Another method is to pass a heavy, double strand of catgut continuously through the segments several times; approximate the ends of the segments, and push the ends of the catgut into the tubing. This ring will have a better surgical finish, and, after the apposition threads are tied between the segments, the ring will maintain its perfect form until the catgut is absorbed. The rings were passed as early as the fifth day, in one of my experiments. In forming an anastomosis, after ordinary No. 6 darning needles are attached to the apposition threads, compress the ring and pass it through the opening made in the lumen of the bowel, then pass the threads through the intestinal wall from within outward. Ascertaining that the ring rests well in place, proceed to the second in the same manner; appose, and after scarification of the marginal serous surfaces, as suggested by Senn, tie the apposition threads. When possible, it is well to utilize omental grafts, which add to the security.

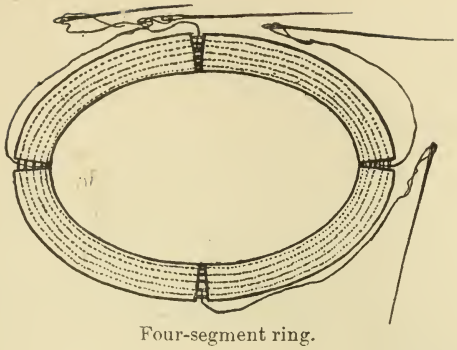
With two such rings, circular enterorrhaphy may be performed, the rings corresponding in size to the lumen of the bowel, care being taken that they are not so large as to press too much upon the delicate mucosa or to overstretch the bowel, as a local gangrene might then follow. Introducing a ring at each end of the gut, at the point of section, the threads are passed through the wall less than one-third of an inch from the divided margins. The distal end of the gut is invaginated, and the proximal gut pushed into the distal, bringing the serous surfaces in contact. The threads are then tied, and a few Lembert sutures added, the entire operation requiring less than ten minutes. In one-half of my experiments with this operation, the results were excellent; of the fourteen dogs operated on by this method, in seven the results were all that

could be desired; marked stenosis was found in several cases, and in all a ridge at the seat of the operation. Because of the high mortality, circular enterorrhaphy cannot be compared to lateral approximation. The use of the described segmented rubber rings is not limited to the intestinal tract, but they will be found of great aid in performing all the operations named. In gastrostomy a single ring is used, about an inch and a half in diameter, with six to eight apposition threads. The stomach drawn through a median incision and the opening made, the ring is introduced and the stomach returned to the abdominal cavity. The needles are then passed through the abdominal walls, and the threads tied in pairs, and if desirable the margins of the opening in the stomach may be stitched to the skin, the operation being complete in fifteen minutes or less.

In cholecystotomy, after packing the neighborhood of the gall-bladder with flat sponges to prevent accidental leakage, the viscus is aspirated or incised, and the contents removed. Enlarge the opening sufficiently to admit a small, segmented ring of three-quarters of an inch in diameter, with six to eight apposition threads; pass the threads through the wall of the gall-bladder from within outward, uniting the skin and wound margins by a few extra sutures. The use of the ring will remove the danger of extravasation, and save time. The gall-bladder may be united to the intestinal tract in two ways. Introducing a ring into the gall-bladder, another into either the duodenum or jejunum, the parts are placed *vis-a-vis*, and the threads tied; a few Lembert sutures complete the operation. I believe it will be but a question of time when the ring within the gall-bladder will find its way into the intestinal tract. In using a single ring, the intestine is clamped, and the abdomen packed with flat sponges. A ring is used with the threads looped, each loop containing a needle. An incision of half an inch is made in the *intestine*, after the gall-bladder has been emptied by incision. A ring one-half inch in diameter is introduced into the intestine, and the threaded loops passed through the intestinal walls less than half an inch

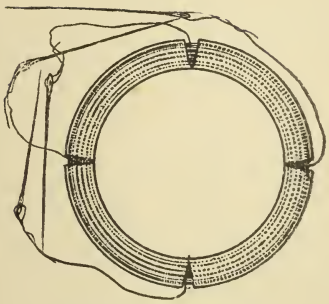
PLATE I.

Fig. 1.



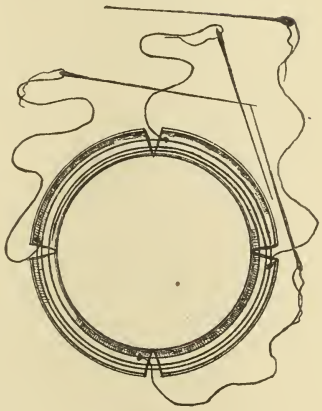
Four-segment ring.

Fig. 2.



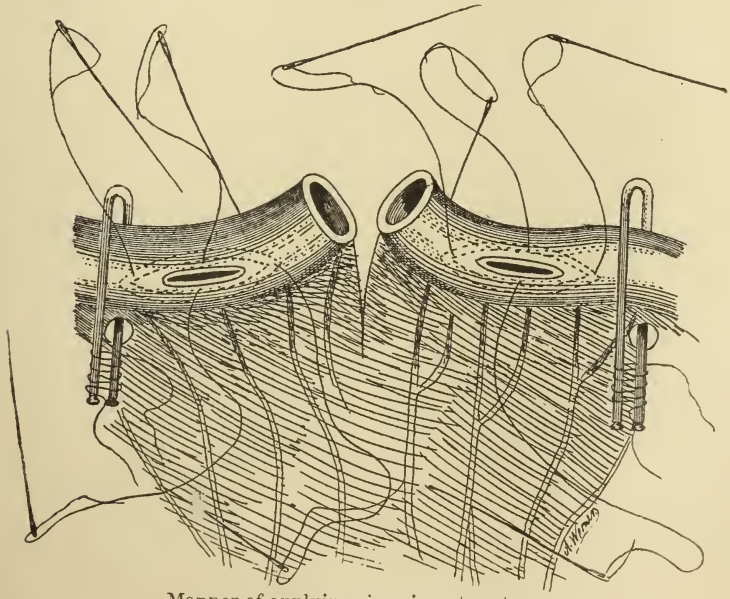
Four segment ring.

Fig. 3.



Sectional view.

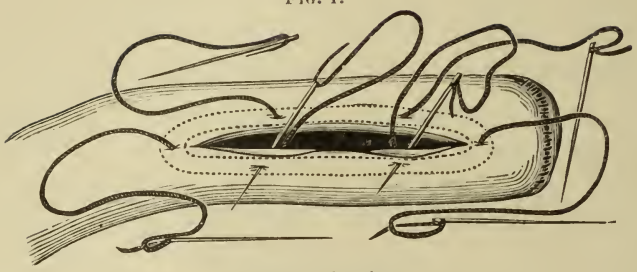
Fig. 4.



Manner of applying rings in enterectomy.

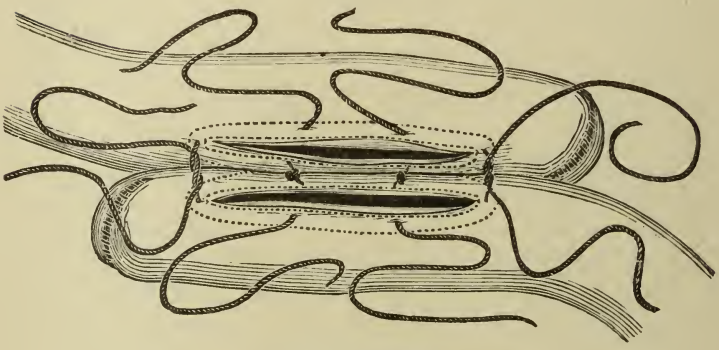
PLATE II.

Fig. 1.



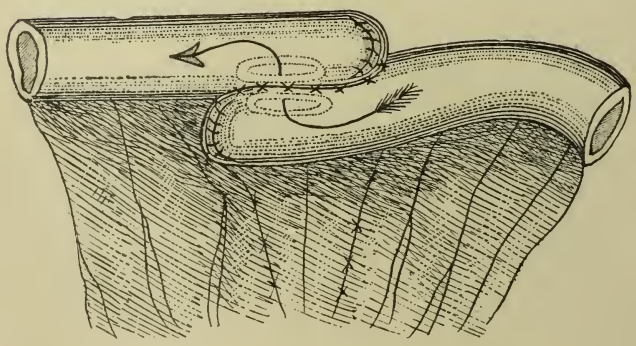
Inserting the ring.

Fig. 2.



Tying the threads.

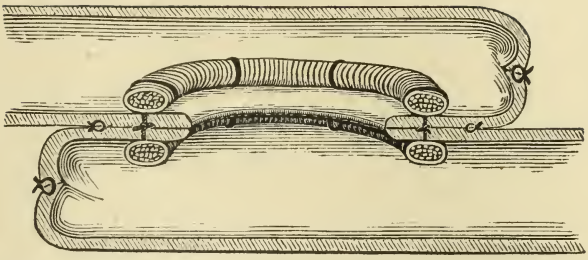
Fig. 3.



Illustrating an anastomosis after enterectomy.

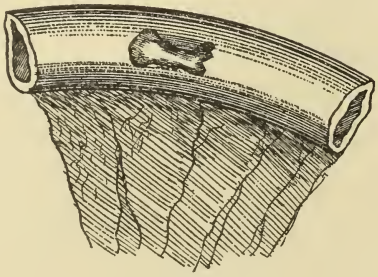
PLATE III.

Fig. 1.



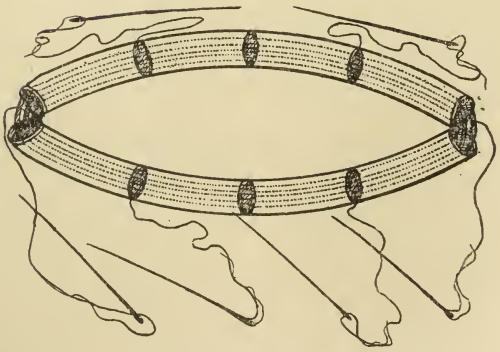
Section through opening and rings in the long axis of the bowel.

Fig. 2.



Gunshot wound.

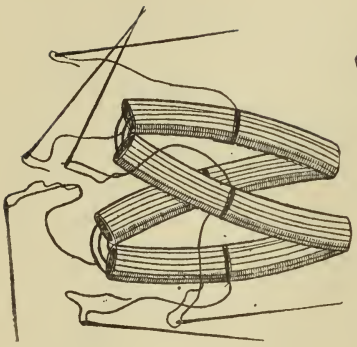
Fig. 3.



Eight-segment ring used in closing gunshot or other wounds where stenosis would follow suturing.

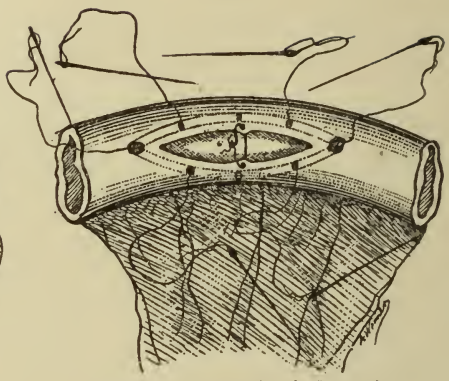
PLATE IV.

Fig. 1.



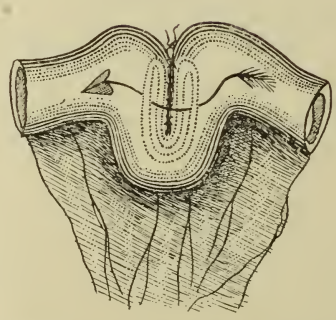
Ring bent upon itself.

Fig. 2.



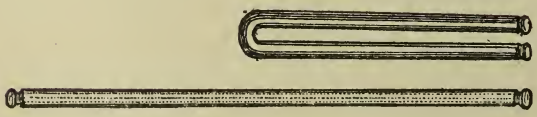
Ring in the intestine before tying.

Fig. 3.



Ring bent double and sutured in position.

Fig. 4.



Clamp of No. 12 copper wire covered with rubber tubing.

[Note.—Figs. 1 and 2, Plate II., and Fig. 1, Plate III., are taken from the paper of B. Farquar Curtis on "Knots, Ligatures, and Sutures," *Medical Record*, Oct. 26, 1889.]

from the wound margins. After passing the threads through the intestinal walls the loop may be cut and one-half only carried through the gall-bladder, then tying the halves. A few extra Lembert sutures complete the operation. This description applies to either duodeno- or jejuno-cholecystotomy. These segmented rings may also be used in attaching cyst walls to the parietes when removal is contraindicated or impossible. The same treatment might apply to abscesses or other accumulations where free external drainage is indicated. In a recent paper on this subject I mentioned a new procedure of closing large wounds of the intestine, especially gunshot, where by ordinary suturing stenosis would result. My experimental work with this device has been highly successful. This method applies to wounds of the surface of the intestine; those of the mesenteric portion usually require resection. By this simple method wounds the size of a half dollar may be closed in less than five minutes. The wound being trimmed and enlarged with scissors, a ring two and a half inches in diameter, made of eight segments of tubing, with six apposition threads, two on each side, is so arranged that when the apposition threads are tied the ring is held bent evenly on itself. Such a ring is introduced into the bowel, the end apposition threads passed, then the lateral, the ring doubled on itself, the end threads tied first, then the lateral, using a single catgut suture in drawing the wound margins together at the point of flexure in order to prevent eversion. A few Lembert sutures complete the operation. If two wounds are close together in the same loop, a lateral anastomosis might be formed, if possible. With more than two wounds close together, excision and lateral anastomosis will require less time than circular enterorrhaphy, or the sewing up of several wounds. Other conditions where the single ring may be used are perforating ulcers, fistulas, etc.

The great advantage of the segmented rubber rings over other devices used, is the simplicity of their construction and the rapidity with which any number may be made. The large aperture of segmented rings makes it possible to perform

ileo-colostomy by the following method, which I believe is original: The ileum being divided a short distance from the cæcum, the divided end of the distal bowel is invaginated into itself and secured by a continuous suture through the serous and muscular coats. Above the proximal end a clamp is placed and a ring adjusted to the lumen; a slit is then made in the convex surface of the ascending colon, and a ring introduced. The bleeding checked, the proximal end of the divided ileum is inserted into this slit, the threads tied, and Lembert sutures added. This operation may be quickly performed and is indicated in such cases as irreducible intussusception of the ileum into the cæcum and malignant disease of the colon.

While carrying out my study of this subject I made experiments with wholly absorbable rings. They present no practical advantages over the rubber segmented rings, require a longer time in preparation, but very much less time, however, than Senn's bone plates. The aperture of the rings may be made as large as desirable. The absorbable rings are very readily made by decalcifying the long bones of chickens, or the long bones of small animals; the process of decalcifying being the same as for making bone drainage tubes as described by Macewen (*Year-book of Treatment*). Through four or more sections of such decalcified bone tubes, are passed continuously strands of catgut in the same manner as described for making the segmented rubber rings. After completing the rings they should be subjected to pressure for a few minutes, then irregularities removed with scissors, and the rings placed in alcohol between the glass slides, such as are used in microscopical work. The attachment of the apposition threads is exceedingly simple, the threads being tied between the segments of decalcified bone tubing to the central catgut strands. A second wholly absorbable ring may be made from the arteries of an ox, or other large animal, the preparation being very simple. The arteries to be used are dissected out from their sheaths, cut into short segments, boiled for a few minutes, and glass rods inserted into the lumen to maintain a proper

tubular shape. The rods are then placed in strong alcohol. After a few days the sections of the arteries may be drawn from the rods and placed in alcohol. Through four or more short sections of arteries so prepared are passed continuously double strands of catgut, and a ring formed in the same manner as the described segmented rubber rings; the apposition threads are attached between the segments likewise. For the closure of small wounds of the intestines I have devised a method of quill suturing which has experimentally given excellent results. The suture to be described is wholly absorbable, and is to be recommended particularly for the simplicity, safety, and rapidity of application. Preparation of the absorbable quill suture is an easy matter. The tibia of a young ox is boiled sufficiently to remove excess of grease and oily matter, is then sawed through transversely into two or three parts and placed in a 30 per cent. solution of hydrochloric acid, the acid being changed every second day until decalcification has taken place. Remove excess of acid by soaking the sections of bone in water to which an alkali has been added. The bone may now be cut with a penknife into rods from one to three inches in length, one-sixteenth of an inch in thickness, and one-fourth of an inch in width. Small openings are made in the bone rods for the passage of the apposition threads, which are attached in this manner: A strand of chromatized catgut, or well-prepared juniper catgut, thirty inches in length, is doubled and a single knot made in the middle of the doubled catgut strand (silk may be used if preferred), the loop and end threads are passed through small openings made in the decalcified bone rods. The rod should be perforated at points half an inch apart, the loop being passed through first, and the single threads through the openings on either side. The manner of applying this suture is as follows: After clamping the intestine the approximation threads of each rod should be threaded to separate needles, the rod introduced through the opening in the intestine, and the needles passed through the intestinal walls from within outward, about one-fourth of an inch from the margins of the

wounds; the second rod is applied in the same manner; traction is made upon the threads to see that the rods rest well in place; the central double threads are now tied, and lastly the single threads. One or two extra Lembert sutures may be added if thought advisable; usually it will not be necessary. This method of suturing will be found to bring into perfect apposition the serous surfaces, and reduce to the minimum—in fact, to do away with—the tendency to eversion of the mucosa. The rapidity of the application will appeal at once to the surgical mind. I claim for this suture accurate, rapid, and safe closure, particularly of small wounds of the convex surface of the intestine. In cases of emergency short sections of rubber tubing may be substituted, but will require an additional Lembert suture or two. Very large wounds may be closed, with less likelihood of stenosis, by use of the single segmented rubber ring, as described. There is a brilliant outlook for the possibilities of intestinal operations. The application of anastomotic methods especially is to the progressive surgeon a field of unlimited developments, and with a thorough understanding of its principles one is master of the many difficult situations. The indifferent success which has been almost the rule in the past will give way to a brighter future. The former difficulties arising in the cure of fecal fistulas need no longer be taken into consideration, for by these new procedures assurance of perfect results awaits the operator. Who would now treat a gangrenous hernia, leaving the gut in the wound to discharge its fecal contents in such preternatural situation? Such treatment, I believe, will soon be a matter of the past.

Appended is a series of operations, with the results:

Gastrostomy: two experiments, two recoveries.

Gastro-jejunostomy: three cases, two recoveries, one death from peritonitis (dog tore out one suture eight days after operation).

Jejuno-ileostomy: one case, result perfect.

Ileo-ileostomy: two cases, one death due to perforative peritonitis.

Ileo-colostomy: two cases, two perfect results.

Colo-colostomy: three cases, one death.

Ileo-rectostomy: two cases, perfect results.

Circular enterorrhaphy: fourteen cases, seven deaths.

Duodeno-cholecystotomy: three cases, two deaths from peritonitis. For anatomical reasons this operation is very difficult to perform on a dog.

Single ring:
- Partial duodenectomy: two cases, one perfect result.
- " Jejunectomy: two cases, two perfect results.
- " Ileëctomy: four cases, one death.
- " Colectomy: two cases, two perfect results.

Summary.—Intestinal anastomotic operations: fourteen cases, three deaths.

Circular enterorrhaphy: fourteen cases, seven deaths.

The single ring, formed of eight segments of tubing, was used in closing wounds varying in size from a quarter to a half a dollar in nine cases with one death. The clamp devised by me, and used in these operations, is made of No. 12 copper wire, covered with unperforated rubber tubing of small size.

DISCUSSION.

Dr. W. O. Roberts, of Louisville.—I have listened to both of the papers just read—they are certainly of great excellence; and while they both arrive at the same end, I should say that Dr. Brokaw's device better suits the indications because it is simple, and every surgeon who undertakes an operation of any size is fully prepared to use it.

Dr. Davis's plan of scraping the peritoneal covering of the gut I think better practice than that of scarifying it as practised by Dr. Brokaw, because there is little or no hemorrhage in the first, while the latter may give rise to troublesome bleeding. I can recall a number of cases once under my care, in which, had I known what I know now—what I have learned from these papers—the result might have been very different. One case partic-

ularly, in which there was considerable loss of tissue in the ileum, resulting from phlegmonous inflammation, I remember in doing resection of the gut I used simply a large plug of cocoa butter for the lack of a better device. The patient did well for forty-eight hours, when collapse suddenly came on and death quickly followed. The post-mortem examination showed that gas and stuff had escaped through an ununited portion of the wound.

In many cases of gunshot and stab wounds of the intestines there is such extensive loss of tissue that in closing the wound the lumen of the gut is in many instances so much diminished as to interfere seriously with the movement of fecal matter.

In the first case of intestinal wound that came under my observation, which, I may add, according to Sir William MacCormac, furnished the first laparotomy for intestinal wound recorded in this country, was the result of a stab. The patient was a large and fleshy man. He was seen by a physician, the wound closed, and the patient sent to the infirmary. I saw him four hours after the receipt of the wound and found considerable hemorrhage going on, the patient already showing its effect. Immediate laparotomy was decided on. It was found that the wound in the abdominal walls had been brought together. The sutures were superficial, however, and the hemorrhage came from the deeper portion of the abdominal wound.

The peritoneal cavity contained a considerable amount of blood. I found a large ragged wound in the small intestine and a puncture through the mesentery. Neither of these wounds had been detected by the physician who first saw the case. Blood was spouting from two vessels in the mesentery; these were quickly tied and the wound in the intestine brought together by a Lembert suture. This procedure so lessened the lumen of the gut that I feared for the result. I cleaned the cavity of blood, however, and closed the abdominal incision. Symptoms of intestinal obstruction occurred forty-eight hours after, such as vomiting and marked distention of the upper portion of the intestinal tract. Twenty hours later fecal matter was vomited. In order to determine, if possible, whether the obstruction was complete or not, a dose of castor oil was given; fortunately it was retained, and eight hours later an alvine dejection occurred, containing distinct traces of the oil. All evidences of obstruction at once disappeared. Owing to the large calibre of the

wound and its ragged condition, some portions of tissue required to be clipped off. Had I known then what I know now I should have practised the method of anastomosis set forth by the essayists.

Dr. Virgil O. Hardon, of Atlanta, Georgia.—I feel like Dr. Roberts, that these two papers have fully repaid me for coming to Nashville to attend this meeting, even if I had heard no others.

This is a subject which is extremely difficult to understand fully by any written description. It is only by seeing it demonstrated, as was done this morning, and described by word of mouth, that one can appreciate it fully.

The papers read have dealt with the subject more from a surgical point of view. I feel that it is a matter which is equally important to the gynecologist—in short, to any man who has to deal with abdominal surgery in any of its respects; for we are liable in any case in which we open the abdomen to meet with accidents, in the way of injury to the intestines, which may call for just such procedures as those that have been described in the papers of Drs. Davis and Brokaw. For that reason I feel that it is not a surgical subject altogether, but one equally of interest to those who limit themselves entirely to gynecological work. I have had no experience in this matter and knew very little of it before I came here. It is not my purpose to discuss the subject at all, except that, being engaged in gynecological work exclusively, I feel that we should avail ourselves of these methods, and we are as much indebted to those gentlemen who have elaborated the subject so fully as are those engaged in surgical work alone.

Dr. A. M. Owen, of Evansville, Indiana.—Mr. President: The two gentlemen who preceded me said that the papers of Drs. Davis and Brokaw repaid them for their time in coming to this meeting. I will say this: I have heard the majority of the papers that have been read, and I have not heard a single one but what has amply repaid me for coming here.

I have been engaged in this work in a limited way, and I fully appreciate the work they have accomplished. Their efforts have been in the right direction. These papers are valuable surgical contributions not only to myself, but to everyone who has had the pleasure of listening to them.

Dr. Hunter McGuire, of Richmond, Va.—I wish I could add something to what you have already heard. The subject is an exceedingly interesting one to me. I had the honor, in 1880, at the meeting of the American Medical Association, as Chairman of the Section on Surgery, to read a paper on gunshot wounds of the abdomen. I was one of the first to advocate operative interference in these injuries. I advocated not only operative interference, but drainage. We did not know then how to treat such wounds as well as we do now. Of course, any man who went through the late war saw a large number of penetrating gunshot wounds of the belly. Ninety-five per cent. of them died. That was the lowest mortality we could get. We used to say during the war we would infinitely rather be shot through the head and take the chances for life than to be shot through the abdomen. More soldiers got well from gunshot wounds of the brain than from penetrating gunshot wounds of the belly. This is merely a record of statistics with which you are all familiar. When you come to the fact that you had better be shot through the chest or brain than shot through the abdomen, in the old days of surgery, you will see what an important subject this is, and how much credit is due to these gentlemen who have worked in this direction. Their results are wonderful. I think the whole profession is greatly indebted to Dr. Senn, of Milwaukee, for giving us his plan of treatment, and the suggestions of Drs. Davis and Brokaw to-day will add much to what Senn has said. They are valuable contributions. I look back with horror to the days of the war, when I practised surgery on gunshot wounds of the abdomen. We gave them opium, etc., and waited till they died. That was the treatment. Now a man has no right to do this.

Dr. W. W. Potter, of Buffalo, N. Y.—Mr. President, you have invited me into a field where I have very little experience, consequently the remarks I shall make will be mainly of a theoretical character. Nevertheless, perhaps I may be pardoned for taking a moment to say that we should enlarge upon and profit by the views already expressed in the valuable contributions to this subject that have just been read. We are enabled, by following these modern methods of dealing with intestinal wounds, especially if we act promptly, to attain a good degree of success, even in cases where the danger line has been considerably over-

reached; moreover, we are taught by all the experience and observation of the past that we should not wait for symptoms when we have a gunshot or other penetrating wound of the belly presented for treatment. If a man were shot to-day, and we should find a hole in his abdomen, with his pulse at 90, and he should be heard clamoring for something to eat and drink, we are not simply to fold our hands and stop there, contenting ourselves with the delusion that he is doing well, and wait for the development of symptoms, as is reported to have been done in a recent celebrated case in which all modern surgical teachings were grossly violated; but it will be our imperative duty to ascertain absolutely whether the cavity has been penetrated, and if so, whether any of the viscera have been injured. The diagnostic incision contemplated by this dogma may be, in some cases, only very superficial, but it must be such a one as will assuredly afford information as to whether the wound enters the abdomen itself, and whether a missile has gone through into the intestines or other viscera. An aseptic exploratory finger introduced through such an incision cannot add to the dangers already surrounding such a case, and if it should disclose visceral injury it will be our further duty to enlarge the incision, with a view to ascertain precisely the nature and extent of the damage done, and then and there repair it, without waiting under the opium treatment for symptoms to develop.

Your allusion, Mr. President, to the military surgical practice of the late war, interested me greatly because of your well-known great experience as a military surgeon, and it recalled to my mind many cases of soldiers that were wounded in the abdomen, a great number of such having passed through my hands while I was in charge of the field hospital of a division in the Army of the Potomac. I look back regretfully upon the surgery of those days, chiefly with reference to that of the great cavities of the body, for it is in those that, with our present knowledge, there might have been great improvement, and hence many lives saved.

Dr. R. M. Cunningham, of Pratt Mines, Alabama.—If I understood the gentleman correctly, Dr. Davis says that the material Dr. Brokaw uses is rubber, and that their devices will answer the purpose at the time equally well, but that the catgut

mats or plates have an advantage over the rubber rings. The absorbability of the catgut is, possibly, favorable to success.

The last speaker spoke of the necessity of opening the abdomen in cases of gunshot wounds. I had the honor, in a series of cases read before this Association last year, to include one of gunshot wound of the abdomen. (See p. 107, vol. i. of the *Transactions* of the Association.)

I believe that had an early operation been performed on this patient his life would have been saved. In all cases of gunshot wounds we should open the abdomen to ascertain the fact whether the bullet has entered the abdominal cavity, the damage it has done, if any, and repair it by some of the many methods in use.

A little over a month ago I had a case of gunshot wound, a negro having been shot a little below and to the left of the umbilicus. He suffered from no shock, and from external appearances did not seem to have been injured. Dr. Brown and I made an incision in the direction of the wound down to the aponeurosis of the muscles. We were not certain whether the bullet had entered, but were determined to find out whether it had entered the abdomen or not. It had not entered it. The bullet was not found that day, but was afterward found in the room where he was shot. It had simply gone in and rebounded.

In the future I shall open the abdomen when necessary, because a few months ago I lost a case which I ought to have saved.

Mr. President, I have enjoyed the reading of the papers, and I must acknowledge that I do not understand the technique of the operation, but I am going to learn it. I think the results given in the papers are excellent, and should stimulate every gentleman here to study, because it is in the line of original research.

In regard to hydrogen gas as a diagnostic means to determine wounds of the bowels, it is no doubt reliable when it is practicable to use it. In the country it cannot be had. The chemicals and means of manufacturing it will seldom or never be at hand. Therefore, for a large proportion of practitioners, this means of diagnosis is unavailable. Besides, how will we know if the test by the gas has been negative—that the liver, spleen, kidney, omentum, etc., are not injured? Laparotomy, *per se*, is not very dangerous, and, in my opinion, in all cases where

there is a doubt as to the course of the bullet, the better plan is to operate.

Dr. Richard Douglas, of Nashville, Tenn.—There is, perhaps, no fact so well established and accepted by the profession as an exploratory laparotomy in penetrating gunshot wounds of the abdomen. It is not, however, so generally accepted and practised when we have to deal with incised wounds of the abdomen.

A few weeks ago I was called to see a man who had received an incised wound of the abdomen on the left side. He walked a mile to a surgeon's office, where dressings were applied, and a little rubber drainage-tube about the size of a lead pencil introduced into the cavity. The wound was about two and a half inches to the left of the umbilicus. Three hours after the receipt of the wound I saw the man, and found him in a state of collapse. I removed the drainage-tube, passed in my finger, explored the wound, and found it had entered the abdominal cavity. As soon as I had made preparations and opened the abdomen I found that the descending colon was cut in two, and there was a notch in the quadratus lumborum muscle, from which there was extensive hemorrhage, apparently filled with feces and blood. The man had absolutely no symptoms when he presented himself to the other physician. He supposed it was simply an incised wound, not penetrating the intestines, and treated it in that light. I closed the wound in a proper way, and the man reacted, but twelve or eighteen hours after died of peritonitis. It goes to show that while we accept the dictum of opening the abdomen in cases of penetrating gunshot wounds, we do not do so in incised or punctured wounds, and yet the indications are just as clear in one case as in the other.

Dr. George J. Engelmann, of St. Louis.—I rise to congratulate the gentlemen upon the good work they have done, and to express my satisfaction at the benefits accruing to the abdominal surgeon from the ingenious devices of our talented Fellows.

The ring of Brokaw, and the mat of Davis, are already thoroughly appreciated by surgeons, and I look upon them as a most valuable aid to the gynecologist in abdominal and pelvic operations. An injury to the intestinal tract need no longer be dreaded; hitherto it has been a tedious and delicate task to close

the rent if the intestine had been injured by the knife, or torn in the severing of adhesions with pus tubes or tumors, or worse still, to resect an intestinal coil when matted to an inflammatory mass or engaged with an abscess, procedures which prolonged an already tedious operation indefinitely beyond endurance. We, as progressive abdominal surgeons, should be prepared with the devices which have been here shown, so that we may be prepared for any emergency, and then in cases of abdominal wounds, or of intestinal adhesions with abscesses, tumors, we need no longer fear a dangerous delay if the tract is injured. We should have a supply of these mats and rings constantly on hand in antiseptic solutions, and should never attempt a serious abdominal operation without them.

I am glad to hear the expressions of the gentlemen in reference to the management of gunshot wounds, which is unquestionably in harmony with the teachings of modern surgery, and active interference in the operation of closing the intestinal wounds is facilitated by the various devices which have been here shown that we dare no longer hesitate. For the simplification of methods in the operation for intestinal anastomosis we are greatly indebted to my friend, Dr. Brokaw, and to our worthy colleague (Dr. J. D. S. Davis) from Birmingham. In abdominal and gynecological work these devices may be needed, and an apparatus for the purpose of facilitating procedures or overcoming difficulties which we encounter in dealing with injury to the intestines, must be ready at all times, though rarely needed. It is sorely needed, if at all; it should accompany every abdominal operation. Dr. Brokaw has operated successfully on a number of cases in our city. He has not only proven by experiment the usefulness and success of his methods, but his ring has been utilized in operations upon the human subject with most excellent results; but I will not enter upon details, as he himself will doubtless tell you what has been accomplished. You will find that it is a thoroughly practical innovation, and whatever theoretical objections may be raised to the contrary, I am convinced that practice will prove that the intestinal mat of Davis and the ring of Brokaw are as serviceable as they are ingenious.

So far as gynecological work is concerned, we should be prepared with these devices, and keep them on hand, in order to protect our patients in case of accidental injuries to the intestinal tract.

Dr. W. E. B. Davis, of Birmingham, Alabama.—The ground has been so thoroughly covered by the papers which have been read, that I feel there is nothing left for me to say. I do not think that an anastomosis or anything else will do a man any good in cases of gunshot wounds of the abdomen unless we operate at once. I have been called in consultation within the last three weeks to see three cases of gunshot wounds of the abdomen. The last case I was called to see was in the hospital at home. I saw the case two hours before death. The attending surgeon (and a very intelligent man) said there were no symptoms to indicate an operation when he saw the patient two hours after the injury. In about twenty-four hours afterward the man died with suppurative peritonitis. So in order to meet with success in these cases we must operate promptly.

Another thing: it will not do to be too long in doing these operations. They must be done quickly. If they are prolonged to two hours and a half, our patients will die from exhaustion in five or six hours. There is nothing so important as to do these intestinal operations rapidly.

I think Dr. Brokaw and my brother have done good work for themselves in operating on dogs. We will be benefited by such experience, and learn to do the operations quickly. I never think of going into the abdomen without having some plates or mats with me.

We all give Dr. Senn great credit for what he has done in the field of intestinal surgery. He has stimulated others to work. Too much honor cannot be given him for his valuable contributions on this subject. He has been an earnest, faithful, indefatigable worker, and the work which Dr. Brokaw and my brother have accomplished are additions. I believe the use of bone plates, catgut mats, catgut plates, and catgut rings will in time place intestinal anastomosis in the hands of every practitioner.

I think, too, every gynecologist should take an interest in this subject, as pointed out by Dr. Engelmann, because we never know when we are going to get the bowel torn, and we should be prepared, at all times, to operate at once. Anastomosis is now a settled question. The benefit to be derived from it is not a debatable one.

Dr. Davis.—What I may say now will be partly a repetition of what was contained in the paper I read this morning, but I

wish to say a few words with reference to the methods of Dr. Brokaw. Our methods are not new. It is only in the mechanical devices that are used. Senn has thoroughly illustrated and shown us in his paper before the International Medical Congress the practicability of anastomosis. The only thing new is the suggestion made by Dr. Brokaw in closing the convexity of the bowel from gunshot wounds by his segmented rubber rings, or by my approximation horseshoe plates. He emphasized the fact that his rings can be placed through any opening in the intestine. So can my mats or plates. The double advantage I have is that these mats or plates can be placed in openings sufficiently large to carry the intestinal contents, or applied through openings larger than the gut calibre.

Dr. Roberts said the segmented rubber rings are better because surgeons could make them readily. I will challenge any one to make them faster than I can make my anastomotic approximation plates. As I remarked in my paper, I can make three sets in fifteen minutes, to put into the intestinal tract, If the demand is great enough to justify the instrument-makers to prepare these things, there will be no trouble in getting them; but they do not prepare them for the market, because there is little or no demand for them. I get them by special order.

With regard to laparotomy in cases of gunshot wounds, I would say that Dr. Senn has given us a method in his hydrogen gas test by which we are enabled to make a diagnosis in the majority of cases. I do not open the abdomen when I have the hydrogen gas with me until I have used it. However, I operate, even when the result is negative, should the symptoms indicate viceral injury. In one obscure case, where I could not use the gas on account of being away from home, I did a laparotomy. Do not let the idea go out from this Association, especially from me, that we should open the abdomen of every man that has received a gunshot wound, for all abdominal wounds are not penetrating.

Dr. W. E. B. Davis.—I would like to ask my brother if he has not failed in some cases in using the hydrogen gas.

Dr. Davis.—It is a fact I have failed in some cases, but I think it more the fault of the operator than the gas.

Dr. Brokaw.—I have little to add to what I have already said. I believe the plates to be superior to the thick catgut rings of Abbe, or to the Senn bone plates, and one of the best means

of forming intestinal anastomosis. The segmented rubber ring is an excellent thing to use in all cases; it takes no time to make it. Here is one of its great advantages over other methods.

In reply to Dr. Cunningham, I will say that the catgut within the segments of the ring will be absorbed and the little sections of tubing will soon pass off.

In regard to probing wounds, I believe it is justifiable. I do not agree with Dr. Davis in stating that he would not open the abdomen in every case of gunshot wound to see whether injury had been done. I would do it every time if there was the slightest doubt. We can make a small opening for exploratory purposes, and if we find nothing wrong, as Dr. Price suggested yesterday, we can easily close the wound.

In regard to Dr. Senn's test, I gave Dr. Senn the credit for this entire procedure. He is a credit to America and American surgeons. He has suggested one thing—his hydrogen gas test—and I must confess I am not pleased with it. For instance, we have a wound in the duodenum; the intestines are inflated, you make an abdominal incision, and the guts come out. Now, then, you have these distended intestines covering the seat of the wound. You find the opening and you close it. The question is, How are you to get rid of the gas? I tried this experimentally, and I failed in removing the gas as rapidly as I would like to. Dr. Dalton, in cases in our city hospital, inflated the intestines with hydrogen gas and had ruptures of the sutured wounds.

I thank you, gentlemen, for your kind remarks in regard to my paper, and I hope each one of you, as suggested by Dr. Davis, will go on and try all these experiments. You will get as much practice in two or three weeks' experimenting as you would in ten years in regular practice. It is only occasionally that we meet with these cases in practice. We may meet with two or three cases in a year, and then no more for the next four or five years. I advise all of you to try these experiments and note the simplicity, using whatever technique you may choose—either the appliances suggested by Dr. Davis, Senn, Abbe, myself, or any of the methods you may see fit to adopt, and note the difference in time of such operations and the old methods of circular suturing You will find it is true that the difference in time may be one-fifth or one-sixth; and time is worth everything when we are dealing with injuries of the intestines.

OPEN TREATMENT OF THE ABDOMINAL CAVITY.

By B. E. Hadra, M.D.,
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Abdominal surgery, notwithstanding its immense progress, does not as yet give even a moderate degree of satisfaction in acute diffuse septic peritonitis. Chronic infectious processes, such as tuberculous, or the recently described microbic peritonitis of as yet unknown origin, offer much better prospects for surgical interference. Moreover, connective tissue abscesses and other extra- and intra-peritoneal pus cavities admit satisfactory surgical action. In some instances of septic intra-peritoneal infection the plastic inflammation produces barriers against a general spread, as we know, and under exceptionally favorable circumstances a vigorous constitution may survive the pathogenic germ and its effects. But, as a rule, a fully developed diffuse septic peritonitis, as met in childbed fever, or after perforation of the bowel, or after operative or accidental traumatism, must even to-day be considered more or less fatal, with or without surgical interference. The aim, now, of this paper is to investigate the causes of such an unhappy condition of affairs, and to suggest means to meet it more successfully. I may say at once that I am going to advocate open treatment of the abdominal cavity, or, in other words, to keep the contents exposed until the danger is over.

What are the physiological and pathological peculiarities of the peritoneal sac in comparison with other serous cavities? There is, before all, a far greater power of resorption, and

likewise of secretion or transudation, in the former. And this is not only due to the larger area of surface, but also to the force under which the fluid contents are pressed into the lymphatic system by the respiratory movements of the diaphragm, and also by intestinal peristalsis. Such an arrangement must produce a very quick exchange and removal of the intra-peritoneal fluids. This is like draining a bottle which has the faculty of continually refilling itself; and if this bottle should be full of poison, it is easy to see how much greater the danger must be. Wegner, from his thorough experiments, states that in a rabbit eight per cent. of the body weight is resorbed in one hour. And further, the same author makes it more than plausible that the openings of the large and numerous lymph vessels on the abdominal surface of the diaphragm (discovered by Recklinghausen) perform a suction in consequence of the respiratory movements, which cause a most effective and direct connection of the intra-peritoneal fluids with the lymph current. Such a combined system of resorption makes us understand the rapidity of intoxication from which, not infrequently, the victim succumbs in a few hours.

But there is a second and equally important peculiarity of the peritoneal sac. It is that it is filled with bowels, which, by their peristaltic movements, carry poisonous material in a very short time from the point of infection all around, into every nook and corner, between the coils of the gut, and in every fold of the membrane, and thus spread the disease over an immense area. It can only fail to produce a deadly disease when the septic fluid gravitates to Douglas's pouch or other dependent parts of the peritoneum, and by a happy combination of circumstances it becomes shut up there, either by plastic inflammation, or by a coil of intestine or any other organ; or, if the poisonous material be of very small quantity; or, finally, if it be of relatively benign nature. Considering now that the peritoneum is also a transuding membrane, it is obvious that this, its action, will also be increased by any kind of irritation. This, again, produces a

very favorable condition for the pathogenic germ, to which moisture means life, whilst dryness is death.

Another danger, depending upon the presence of bowels in the infected abdominal cavity, is their own septic condition. The walls easily become invaded by germs through the serosa, and, as a consequence, they become diseased and rendered unable to protect the intra-peritoneal cavity and their own contents from each other. Thus a new infection from the feces is added. The impermeable partition in the healthy here becomes a medium of interchange between two sources of poisonous materials; the germs will travel through the walls in either direction.

In addition to these dangers, in most instances the bowels become distended, which phenomenon is not due only to a paralysis, and to the consequent accumulation of physiological gas, but is caused rather by functional destruction of the tissues of the walls, and by the new formation of pathological gases, in which process the pathogenic germ plays its *rôle* again. Now, the more the tympanites increases, the more pressure on the intestinal wall and the more loss of vitality will follow. Beside, the distended convolutions will press upon each other, and upon all the other abdominal and pectoral organs, and cause general systemic disturbances. And, finally, the pressure on the peritoneum will increase resorption of the poisonous fluids, though in extreme cases necrosis may result from it, and undo all the functions of this membrane.

Summing up now the points making the diffuse septic peritonitis so dangerous, there are:

1. The extensive area of peritoneal surface, with its enormous power of resorption of the poisonous material.

2. The active secretion into the sac, and thereby furnishing cultivating fluids for the germs.

3. The ready absorption by the lymphatics of the diaphragm.

4. The general distribution of the poison by intestinal peristalsis.

5. The infection of the intestinal walls from without, and

the additional infection of the peritoneal cavity by transudation and immigration of germs from the inside of the bowels.

6. The distention of the bowels, increasing the pressure and the resorption.

7. The impeding effect of this latter condition upon respiration, defecation, and secretion of urine, leading to systemic poisoning by retained products of oxidation.

8. In perforative cases the contamination by fecal matter; in stab and shotgun wounds, by other impurities, bile, urine, etc., and before all, by contaminated blood.

What are the indications for treatment? Beside supporting the patient's strength, relieving the suffering, caring for proper action of bowels, kidneys, etc.—in short, beside the general medical treatment, it is obvious, from the foregoing explanations, that the surgeon will have to provide for the following points:

1. To remove the obnoxious material—germs, fecal matter, urine, etc.

2. To prevent its new formation, or a repetition of its entrance. The sac should be kept dry to deprive the germ of its soil; the breaks have to be mended, or the channels of contamination ought at least to lead to the outside.

3. To prevent the bowels from distributing the poison throughout the whole cavity.

4. To counteract pressure and suction, in order to prevent resorption of the poison.

5. To prevent mutual infection of the peritoneum and the bowel.

6. To relieve pressure, in order to avoid disintegration and paralysis of the different structures.

7. To promote respiration, defecation, and urination when tympanites has developed.

Are the present methods satisfactory? This question everybody must answer with an emphatic No! What are the boldest procedures yet followed? The abdomen has been opened and washed out; then either closed or drained by a single tube. A step forward, and, if I am correct, first advocated

by our distinguished president, was to establish multiple drainage. Another way was to drain, and to attempt to maintain dryness by the use of bags of hygroscopic material in the cavity, exchanging them from time to time through a small incision. Still another method is suction through a drainage tube.

None of these approaches, in my humble opinion, even a moderate degree of efficacy. Even a constant irrigation by a powerful current would not suffice. It is only necessary to remind you of the difficulties after laparotomies to get rid of shreds and flecks of blood or detritus, and of larger particles of new growth from between the coils of the intestine, and from the folds of the peritoneum. Lawson Tait recommends to move the hand all over and between the intestines, whilst gallons of water are used to help to wash the foreign substances away. And now think of the innocent drainage-tube through which you invite the obnoxious material to come away. Nothing but the clearing of a limited surface or interspace, to which the tube reaches, will be accomplished, especially when the bowels are distended. And still, our aim should be not only to wash out, but also to keep dry. For this latter purpose the gauze bag and, perhaps, also the suction arrangement, will do some service; but certainly not beyond the nearest neighborhood.

In order to relieve the pressure, especially when tympanites has set in, puncturing, or in cases of laparotomy, incising the gut, is taught. Evidently only transient benefit can be gained by such interference.

Nothing further is done to prevent the exchange of poisonous material between intestine and intra-peritoneal cavity. Nothing, also, is done to prevent the bowels, the peritoneum, and all the other abdominal organs from exerting pressure on each other. Nothing, finally, is done to reduce the resorption by the peritoneum and by the diaphragmatic lymph-vessels.

Open treatment.—In thinking over all these shortcomings, it occurred to me that only open treatment will meet all the indications by which our action should be governed. I mean

by that term a full exposure of the abdominal cavity, which should be maintained until the danger has passed by. As much of the omentum and of the bowels as find no ready room inside should be left resting on the surface. In such a way the cavity would be sufficiently cleansed and kept dry; the bowels, to a great extent, excluded; the exchange of poisonous material diminished; bowels, peritoneum, and all the other involved organs relieved of pressure. But what seems to me to constitute the main benefit, is that the resorption and suction by the peritoneal and the diaphragmatic lymph-organs would at once be greatly counteracted. The siphon action, which it in reality is, will at once be interrupted, because it demands an air-tight space from which to suck. If the beneficial effect of a small opening in the abdomen may be explained in this way, how much greater must be the relief from a wide and permanent one? Beside, a small incision may be obstructed by distended gut, whilst by the advocated plan the closed cavity in a physical sense is really abolished.

From such considerations the treatment I suggest, appears to be an improvement on the present methods. It would also, I should think, in fresh perforation of the intestine or in a great number of traumatic accidents to the abdominal organs, be made use of as a preventive step against contamination, hemorrhage, etc. Where, for instance, the injuries are too extensive to admit repair at once, or where there is much soiling with foreign matter, or where shock or untoward general surroundings forbid a long-lasting or sufficiently aseptic operation, the open method may offer the best chances, leaving further interference to a later time.

What objections could be raised to open treatment? It might be feared that atmospheric contact would prove injurious to organs intended by nature to be shut off from it. Fortunately, experiments on animals, which have been made by reliable men, prove to the contrary. The every-day surgical experience teaches the same fact. The spray has gone, and air of average purity is in hundreds of cases admitted for hours without apparently doing the least injury. Prolapsed parts

have been carried outside the body after accidents for hours and days without harm.

Equally well by surgical experience the deleterious influence of temperature is proven to be more or less a bugbear. Of course, extreme low degrees will harm, but the usual average warmth of closed or—in winter—heated rooms is nothing to be afraid of. That the bodily temperature sinks when the whole abdomen is opened is beyond doubt, but a great deal of the fall is due to the effect of chloroform or ether, which may lower it as much as three or four degrees (*Kappeler*). In fact, any protracted operation on any part of the body offers under the same conditions the same picture of lowered vitality. In the further progress of the open abdominal treatment, safeguards can be easily taken to protect the organs from being chilled.

Now as regards shock, this unexplained condition of intense nervous prostration. It is a known fact that injuries of abdominal organs, especially of the intestine, are before all liable to be followed by it. Still again, surgical experience teaches that a good deal of careful handling can be tolerated. I may remind you of the rough treatment the bowels have to stand in many cases of abdominal surgery. Here, also, the anæsthetic and the loss of blood and rapid sepsis account better for the shock following the operation, than the nervous paralysis.

Next, the irritation of the dressings over the internal abdominal organs may be dreaded. But, from my experience and experiments, we possess in the gutta-percha tissue a nearly ideal non-irritative air- and germ-tight material.

Another objection will perhaps be the probability of consequent omental and intestinal adhesions. Though such considerations, when life is at stake, cut a very small figure, still we may feel at rest when we study Dembowsky's experiments, proving that only the presence of pathogenic germs or of foreign bodies causes adhesions. Thus we may avoid such untoward sequelæ. And, more than that, we will, by doing

away with the septic inflammation prevent, rather than excite, adhesions.

Finally, the restitution of the abdominal walls may, after the abdomen has been kept open for a long time, be considered difficult. But there is no trouble about the peritoneum. It heals readily, as many a case shows where it becomes torn and lacerated. Closing the muscular walls is certainly no unsurmountable obstacle.

Experimental support of the proposed treatment.—Thus far I have only given theoretical deductions and speculations. Knowing, however, that more than this is necessary to urge on any practical man to believe in a new and seemingly bold procedure, I regret that I cannot produce any facts drawn from a performed operation on men. Since I began to work out my problem only one chance presented itself to me to carry out my plan; but, unfortunately, being a case of full-fledged sepsis from an incarcerated hernia with complete gangrene of a loop of intestine, of the sac, the testicle, and a large area of the parietal peritoneum, there was little show for any treatment. But, nevertheless, the simplicity and the nicety of keeping the disturbed bowels outside the widely opened abdomen, the ease with which everything could be kept clean, the perfect drainage, etc., impressed me and my assisting colleagues most favorably.

But, to make good the deficiency of evidence on human patients, I made experiments on rabbits and dogs, with the assistance of Dr. George Dock. The two uncomplicated operations—one on a rabbit, the other on a dog—where the abdomen was split from symphysis to the sternum, and where, under a very simple protection, everything was left to itself, did so exceedingly well that they offered all the proof necessary to satisfy me that such interference, *by itself*, is not a dangerous undertaking. All other considerations are met, I trust, by the foregoing theoretical deductions, and what is by far more important, by surgical experience. I know very well that peritonitis is not as easily established in animals as in men; but thinking how much more perfect the after-treatment must

be in the latter—how much the human patient himself will aid the surgeon and nurse, whilst animals do all they can against a cure—I should think that the difference is more than compensated.

But here is the report of the two experiments:

Case I.—A female rabbit was operated on on the 12th of July in the pathological laboratory on the demonstrating table—of course, not under very aseptic surroundings. Instruments, hands, and dressings were well disinfected; the animal roughly shaved on its abdomen and washed there with sublimate solution Then the abdomen was opened throughout the whole linea alba. The prolapsed bowels, forming a mass larger than a fist, were kept outside and the lump they formed was covered with a piece of disinfected gutta-percha tissue, which was sewn directly to the skin all around. A padding of absorbent cotton and a roller bandage finished the dressing. After coming out of the narcosis the animal took up its usual ways, feeding and defecating regularly. When it was examined on the fifth day there was a large hernial sac hanging out, but nearly all over covered by the peritoneum, whose two halves were approaching each other rapidly, so that at the seventh day the gap was closed. The skin crept up on the peritoneum and gradually the sac grew smaller and more and more covered by skin. Ten weeks after the operation there was no mark of the operation left except a diastasis of the recti muscles, about one and a half inches long and one-half inch wide. The animal was killed, and it was found that beside the partial failure of the recti to unite, a slight adhesion of the bowels to the peritoneum constituted the only anomaly.

Case II.—A dog was operated on in the same room and in the same manner, on the 23d of August. The history of this case is exactly the same as that of the rabbit. The most interesting feature was the enormous thickening of the peritoneum, gradually increasing with the length of exposure. The animal was killed three weeks after the operation, when the ventral hernia had still the size of a large orange. Here some intestinal loops were found adherent to the peritoneum.

The results of these two cases were so convincing to me that no further trials were made with uncomplicated laparoto-

mies. More complicated experiments did not do well, the animals dying under the anæsthetic or from want of care. It is not necessary, however, to go into details about them.

Outlines of the proposed treatment.—I would advise to proceed in the following way: Opening the abdomen under known precautions as extensively as possible in the linea alba, taking the navel as the centre of the incision, say four to six inches on each side will be not too much. The protruding bowels should be carefully placed on the skin, allowing them all the spare room their distended condition demands. Then the aseptic hand enters all folds and interspaces of the abdominal cavity, and whilst sterilized warm water is following it in great quantities, every nook and corner is freed from its contaminations. Patient then is laid on his or her sides alternately, so as to let the water flow off. The bowels outside ought, of course, to be flushed freely. After the balance of the water has been sponged out by cotton or gauze, a large iodoform plug or of similar material should be left in each lumbar cavity, perhaps also in Douglas's pouch. If the bowels be very much distended they could be punctured or incised outside. After such a thorough cleansing a piece of gutta-percha tissue is put over the abdomen, so as to cover and to overlap the intestinal protrusion. Perhaps the tissue will be best fastened to the skin by collodion or traumaticin laterally, but on the most dependent places plugs of absorbent material may be interposed between tissue and skin, in order to absorb the discharges. Perhaps it will be more convenient to fasten two halves of tissue laterally and to have them overlap each other in the middle line, which would form a kind of door, admitting working without removing every time the whole apparatus. A light flannel cover may then be put over the tissue, and, finally, a cradle should be placed over the abdomen, so as to keep the bed-clothes from the latter. If necessary hot bottles or similar contrivances may be kept inside this cradle to raise the temperature. Also a Kelly's pad could be used permanently under the patient to protect the bed from fluids. I only wish that the closing apparatus could be worked from a distance, perhaps by a

rubber tubing attachment. The dressings and washings, the removal of the iodoform tampon, etc., will have to be repeated as often as it seems necessary—at least once or twice in twenty-four hours. Of course, additional treatment, such as care for the bowels, kidneys, and, before all, the administration of alcohol, which in the hands of the Germans, at least, does wonderfully well, should not be omitted.

As soon as the danger is considered over, and especially as soon as the bowels regain their normal calibre and retract by themselves, a piece of disinfected gutta-percha tissue may be inserted between the abdominal contents and the parietes, and the lips of the latter's wound freshened, stitches inserted, and whilst they are knotted the tissue gradually withdrawn, which will prevent the cavity from becoming soiled. I do not think that it is necessary to stitch the peritoneum separately, but that will depend upon the operator's individual judgment.

But it seems to me well to meet a doubt regarding the feasibility of a frequent intra-abdominal dressing without giving an anæsthetic every time, which, of course, would constitute a very grave objection to the proposed method. But, recollecting how often after a performed abdominal operation the "toilette" is made whilst the patient is already more or less out of narcosis, and how little he suffers from it, I entertain very little fear from such an obstacle.

Somewhat different from the described procedures the *modus operandi* will have to be in cases of *preventive* open treatment. Here we will have to be much more strict in regard to asepsis, and perhaps only the injured or bleeding parts will have to be kept outside, retained there by aseptic or iodoformed bundles or tampons. Also frequent redressing will have to be avoided. The transparency of the gutta-percha tissue will, perhaps, admit watching without removal of the cover.

NOTE.—Dr. Joseph Price incidentally mentioned that Dr. Warner and, perhaps, also others, had followed the proposed plan of open treatment, and done so with success. I regret that the reports on these cases have escaped my attention; they will certainly only strengthen my suggestions.

TWENTY CONSECUTIVE CASES OF ABDOMINAL SECTION.

By L. S. McMurtry, A.M., M.D.,
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When requested by our distinguished President to contribute a paper to the proceedings of this Association it occurred to me that I might best utilize the time placed at my command by a collective review of a series of cases illustrating a variety of pathological conditions and operative measures in abdominal and pelvic surgery. The cases here tabulated comprise the first twenty abdominal sections performed by myself, taken consecutively, and are reported as a basis for thorough discussion of this important class of surgical and gynecological cases.

All these cases were in private practice, and with two exceptions all the operations were done at the homes of the patients. Two cases were treated as private patients in a well-appointed hospital. In every case operative treatment was resorted to only after all ordinary and so-called conservative methods had failed, and in several instances the operation was not accepted until the patient's condition was regarded as hopeless, both by the family and attending physician. In no case, however desperate and complicated, have I refused to operate. Considering the gravity and variety of the pathological conditions, and that all were *late* operations, the results are as good, I believe, as any yet attained. These results confirm the fact demonstrated by Price and others, that abdominal work can be executed as successfully in the homes of the patients as in special and

No.	Age.	Pathological condition.	Adhesions.	Drainage.	Result.	Remarks.
1	32	Ovarian cyst	Slight.	No.	Recovery.	
2	29	Ovarian cyst	Extensive.	No.	Recovery.	Very large tumor; omental and intestinal adhesions.
3	27	Ovarian cyst	Extensive.	No.	Recovery.	
4	31	Ovarian cyst	Dense and extensive.	Yes.	Recovery.	
5	29	Cirrhotic ovaries and chronic salpingitis	Dense.	No.	Recovery.	Ovaries and tubes removed; patient had been an invalid for years. Complete cure.
6	17	Cancer of intestines	.....	No.	Recovery.	Operation purely exploratory; caput coli and ileum a cancerous mass; patient died soon after from the disease.
7	65	Tubercular peritonitis; encysted dropsy	.....	No.	Recovery.	Patient in good health three years after operation.
8	35	Suppurating hæmatocele, peritonitis .	.....	Yes.	Recovery.	
9	35	Pyosalpinx and general purulent peritonitis.	.....	Yes.	Recovery.	Appendagesremoved; drainage-tube kept in twenty-eight days; complete recovery.
10	31	Typhlitis, perforative peritonitis .	... .	Yes.	Recovery.	Double perforation of cæcum; purulent peritonitis; first case of non-traumatic perforation on record saved by laparotomy.
11	34	Extra-uterine pregnancy . . .	.....	Yes.	Death.	Large fœtus, past viable period, dead and decomposing; septic symptoms preceded operation. Death from hemorrhage.
12	28	Tubercular peritonitis	.....	Yes.	Recovery.	Patient died afterward with pulmonary lesions.
13	31	Large ovarian cyst; pyosalpinx on opposite side.	Universal and dense.	Two tubes.	Recovery.	Patient *in extremis*, at time of operation, from peritonitis; irrigation of peritoneum for ten days. Complete cure.
14	27	Cirrhotic ovaries	Dense.	No.	Recovery.	Ovaries and tubes removed; patient invalid for six years prior to operation; convulsions; opium-habit; marked improvement.
15	29	Uterine myoma; soft and œdematous	Extensive.	No.	Recovery.	Supra-vaginal hysterectomy; mass weighed twenty-one pounds: œdematous; severe pressure symptoms; extra-peritoneal pedicle; complete recovery.
16	39	Double ovarian cyst	Dense.	Yes.	Death.	
17	36	Ovarian cyst	Dense.	Yes.	Recovery.	Had been tapped with trocar four times; very large cyst, weighed 42 pounds.
18	40	Ovarian abscess and pyosalpinx . .	Dense.	Yes.	Death.	Patient *in extremis*, emaciated, night-sweats; pigmented skin; very large abscess cavity; death ten days after operation.
19	29	Extra-uterine pregnancy . . .	.....	Yes.	Recovery.	Ruptured tube; pelvis filled with blood-clot. Complete recovery.
20	36	Cystic ovaries; chronic salpingitis .	Firm.	No.	Recovery.	Appendages removed. Cure.

private hospitals.[1] Indeed, an airy room, thoroughly cleansed, in a country home, is the ideal location for abdominal surgery. The hospital may subserve the surgeon's convenience, but it yields no special advantage to the patient. With the growth of experience both the operative technique and the after-treatment have been constantly simplified. When the surgeon has done his work thoroughly active interference is rarely necessary in the after-treatment. Neither medicines nor active nursing are required. Beside the care of the drainage-tube and the administration of a purgative there is little else for nurse and physician to do. Indeed, as a rule, the patient will do best when kept quiet and let alone after being put to bed.

In this series of cases the difficulties attending the diagnosis of intra-abdominal disease have been well illustrated. Case No. 7 was diagnosed by four different surgeons as ovarian cyst before I saw the patient. The history and physical signs were characteristic of ovarian cyst. On opening the abdomen it was found to be a case of encysted dropsy, the result of tubercular peritonitis. Evacuation and irrigation were followed by quick recovery. Although the peritoneum was studded everywhere with miliary tubercles, and the patient sixty-eight years of age, this lady rapidly gained her flesh and strength, and now, three years after the operation, is enjoying good health and activity without any signs of abdominal disease. So far as I am aware, no explanation as to how the operation arrests the tubercular process bas been made. It is a clinical fact, however, attested by many operators and confirmed by the accumulation of experience in abdominal surgery. Van de Warker, Spencer Wells, Croom, and many others have recorded cases found in good health years after the operation. Some operators have dusted the infiltrated peritoneum with iodoform; others have irrigated with a solution of bichloride of mercury and other antiseptic solutions. It seems immaterial how the peritoneum is treated, so it be

[1] Vide Report of Seventy Consecutive Abdominal Sections Performed at the Homes of the Patients, with One Death. By Joseph Price, M.D., in Pittsburg Medical Review for October, 1887, p. 268.

evacuated and cleansed. As a rule, the operation has been performed upon a diagnosis of ovarian cyst.

The case of uterine myoma (No. 15) was also believed to be a cystic ovary. The tumor was very soft and heavily œdematous, so that it fluctuated distinctly. The history and general condition of the patient tallied with the deceptive diagnosis. It was only when the abdomen was opened that I realized that I was to do a supra-vaginal hysterectomy instead of an ovariotomy. I find this to be the uniform experience of other surgeons who have dealt with these cases. This lady was suffering severely from pressure symptoms, especially relating to the bladder and stomach; was emaciated and failing fast in vitality. After turning out the tumor, I tied off and divided the broad ligament on either side down to the level of the internal os, and treated the pedicle extra-peritoneally with the *serre nœud* as practised by Bantock. The tumor *en masse,* including the body of the uterus, weighed twenty-one pounds. The patient made an uninterrupted recovery, and is among the best of my results. This is an operation of no ordinary magnitude, and requires pluck and endurance in its execution.

Beside illustrating the difficulties of diagnosis, this series of cases also demonstrates the great variety in the complications one must expect to encounter in dealing with intra-abdominal affections. No two cases are alike, and unexpected difficulties are constantly presented to the operator—difficulties, too, which must be quickly recognized, quickly decided, and quickly met. In my cases prolonged and repeated attacks of peritonitis had occurred prior to the operation; hence, adhesions and hemorrhage were formidable and constant complications. Having learned that before opening the abdomen no accurate estimate can be made as to the extent and gravity of the complications to be met in any given case, I have made it a rule in operating to have at hand every preparation for every emergency, including as probable hysterectomy and suture of intestines.

It will be observed that seven of the twenty cases here re-

ported were ovariotomies. In every instance the cysts were large, and with two exceptions had been tapped several times. One was a suppurating cyst, complicated with pyosalpinx on the opposite side (No. 13), with unusually dense adhesions. In the course of the enucleation the abdomen was flooded with foul pus. Thorough irrigation, which by means of two drainage tubes, one at the upper angle of the incision and the other at the lower, I was enabled to repeat every few hours for ten days, rescued the patient. She made a perfect recovery and remains in vigorous health at the present time. The only death of the entire list of cases which I believe could have been averted was in case No. 16. It was an ovariotomy. The patient's condition was extreme; the operation difficult and complicated, and through impure water furnished me while operating septic peritonitis resulted. The source of the water was pure, but the vessels used for heating it were not properly cleansed and purified. Since that time I have made it a rule to use distilled water, sending a demijohn of five gallons to the house the day before the time fixed for operating. I also give my personal attention to the heating of the water, and see that thorough cleanliness is observed. My ovariotomies, with this one exception, resulted in recovery. All were complicated, and some were extremely difficult. In skilled hands ovariotomy is the most successful major operation known to surgery. It may chance to be one of the simplest, or it may prove one of the most difficult.

The operations upon the uterine appendages are among the most trying in the entire field of pelvic surgery. To remove pus tubes and adherent ovaries, buried in a mass of adhesions, and friable from cheesy degeneration and suppuration, is among the most severe tasks of operative surgery. Normal relations are destroyed by the exudation, the fingers must make a track to the floor of the pelvis, and blood and pus well up as the exploration and enucleation proceed. The sight gives no aid; the work is done wholly with the two fingers deep in the pelvis. Thorough work, irrigation, and drainage constitute the only basis of success in these cases. My cases

of tubo-ovarian disease illustrated several grades and varieties of these lesions. All the patients had suffered long and severely. In three cases large pus tubes were removed. The one fatal case (No. 18) was in an extreme and wretched condition when abdominal section was done. The left tube and ovary were destroyed by suppuration and had formed an immense abscess filling the left side of the pelvis. She was septic and emaciated, with pigmented skin. An early operation would doubtless have saved her. These cases were formerly classified and treated as pelvic cellulitis. Thirty years ago Bernutz and Goupil described their true nature and pathology, but it is only of late that the importance of their researches has been appreciated. The intra-pelvic inflammation (peri-

Fig. 1.

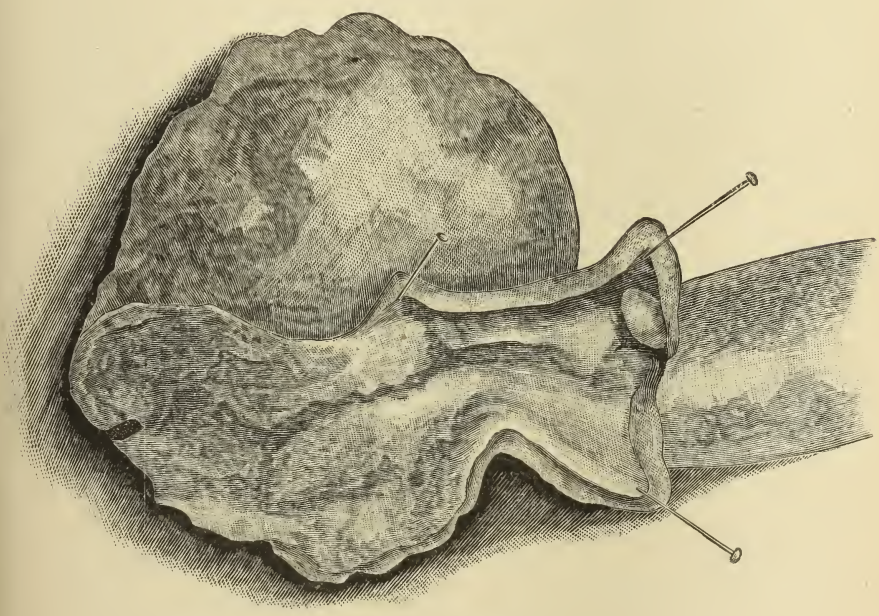
Double pyosalpinx (gonorrhœal). Right tube ruptured.

tonitis) is the result of infection, beginning in the endometrium and extending by continuity of surface into the Fallopian tubes. The infection in two of my cases was unquestionably gonorrhœal; in the others it was traceable to the puerperal state. Fig. 1 is the reproduction of a photograph taken directly from the specimens removed in one case.

The specimens will be recognized as the Fallopian tubes

enormously enlarged and distended with pus. It will be observed that the right Fallopian tube had burst. On opening the abdomen and separating adhesions fully three ounces of pus escaped from this tube. The other was removed intact and was distended with pus when the photograph was made. When the patient was examined prior to operation the uterus was fixed and surrounded by a boggy mass. Active peritonitis was established, and the patient had had rigors and persistent elevation of temperature. The symptoms and physical signs were those commonly interpreted as pelvic cellulitis terminating in pelvic abscess. It was in reality pyosalpinx, the result of gonorrhœal infection and consequent pelvic peritonitis.

Fig. 2.



Pyosalpinx and abscess of ovary. Fallopian tube laid open.

In Fig. 2, drawn directly from a specimen, the same condition is illustrated more minutely. The tube is laid open and the ovary adjacent is involved in the suppuration, with firm adhesions to the fimbriated extremity of the tube.

The terms pelvic cellulitis, *parametritis*, *perimetritis*, and pelvic abscess should be expunged from the nomenclature of intrapelvic inflammations. The terms *salpingitis*, *pyosalpinx*, *ovarian abscess*, and pelvic peritonitis indicate the real seat and character of the disease and structures involved. When suppurative inflammation is established within the pelvic peritoneum the seat of disease will be found in the uterine appendages. Suppurative changes in the appendages may originate in ruptured tubal pregnancy, or in a dermoid or other ovarian cyst. The most common cause, however, is salpingitis, resulting from infection by gonorrhœa, parturition, or the introduction of foul instruments, tents, and other foreign substances into the uterus.

I am particular to illustrate directly from specimens these lesions of the appendages, since much and severe criticism has been incurred by gynecologists in connection with this class of cases. Indeed, by many, diseases of the uterine appendages seem to be regarded as very trivial forms of disease. When large pus tubes, along with ovaries destroyed by suppuration, are removed, the operation for opening an abscess and removing disintegrated structures is condemned under the terms of "castration of women." That injudicious and over-zealous operators have abused the operation of removal of the appendages I have no doubt. Resort to this procedure for mild grades of inflammation, for congestions, for pain and nervous disturbances, is most reprehensible and cannot be too severely condemned. That the operation has been, and is now, abused should have no weight whatever in justly estimating and intelligently applying a great improvement in our knowledge of a most serious class of diseases. Many practitioners to-day are treating pelvic cellulitis with local applications to the cervix uteri and vaginal fornix, often terminating in abscess opening into bladder or bowel, or may be into the peritoneum with fatal peritonitis, which could be cured by abdominal section and removal of the diseased and disintegrated structures. Moreover, the work of prevention cannot begin until the profession recognizes the relation of puerperal, gonorrhœal,

and other infections to inflammatory diseases of the uterine appendages. It is evident that many who criticise operations upon the uterine appendages have no practical knowledge whatever of these lesions.

Indiscriminate selection of cases and injudicious resort to removal of the appendages for vague neuroses have done the procedure harm; but properly applied it saves life, restores health, and yields cures that are complete.

In Cases 8, 10, 13, and 19, operation was performed in the midst of active peritonitis, with vomiting, tympanites, rapid pulse, and elevated temperature. As soon as the patients recovered from the ether after being placed in bed, small doses (2 grains) of calomel were dropped on the tongue every hour until the bowels were freely moved. The action of a purgative given in this way under these circumstances, is almost like magic, and within a few hours puts a new and favorable aspect upon a desperate case. Irrigation and drainage were, of course, used in these operations.

The case of double perforation of the cæcum with peritonitis (No. 10), I reported fully in the *Journal of the American Medical Association* of July 7, 1888, giving in detail the lesions found, the operation, and the progress to recovery, together with the names of the physicians present. This is the only case on record wherein a non-traumatic perforation of the cæcum has been successfully treated by abdominal section and suture of the gut. I allude to the case here to say that now, after two years have elapsed, the patient, who is a physician, is actively engaged in the discharge of his professional duties. The case teaches the valuable lesson that prompt surgical interference is the only treatment in cases of peritonitis starting about the *caput coli*. It is only after the abdomen is opened that we can determine the exact character of the lesions—appendicitis, cæcitis, etc. To find the seat of disease and deal with it upon sound surgical principles, cleanse the peritoneum and drain, are the indications to follow. And this should be done before the patient is moribund.

In my first case of extra-uterine pregnancy (No. 11) the fœtus had advanced beyond the period of viability, and was dead before I saw the patient. The advent of septic symptoms made the operation imperative. The child was found dead and decomposing, and the membranes had been absorbed. Death occurred as the result of placental hemorrhage. The desperate nature of these cases, and the problem of how to deal with the placenta, are so familiar that I will not go into details. My second case (No. 19) was a case of tubal pregnancy, in which rupture had occurred at about the ninth week. A week elapsed after tubal rupture before I saw the patient. On opening the abdomen, I found the pelvis filled with an immense blood-clot. I tied away the right appendage along with the fœtal sac, irrigated, and drained. The patient made a quick and complete recovery. It is now known that this accident is quite common, and every practitioner should be able to recognize the indications for operation. Immediate operation, arrest of hemorrhage, and removal of the torn appendage with the sac, are the steps necessary to save the patient. In the light of recent knowledge on this subject there is a great work before the profession in the surgical treatment of extra-uterine pregnancy. When rupture takes place into the peritoneum, prompt operation alone will rescue the patient from death by hemorrhage. Destruction of the fœtus by morphine injections into the sac, or by electricity, is unsurgical and unsafe, leaving a mass liable to suppurate.

Whatever of success I may be permitted to claim for myself in abdominal surgery, I attribute it to two things: Close and unremitting attention to details in preparation for the operation, and thorough work in the operation itself. In the preparation of the patient and the patient's surroundings, I have made it a rule to see to all details in person. In the cleaning of instruments, preparation of sponges and dressings, I do the work myself, and spare no trouble or pains in having everything in a state of surgical cleanliness. Recognizing the fact that the worst results in abdominal surgery, together with the necessity for secondary operations and troublesome sequelæ,

come from imperfect and incomplete work at the operating-table, I have in all cases nerved up to doing the work thoroughly even under desperate circumstances. To cultivate habits of cleanliness in person and instruments I have given constant attention, and to see that my patients and surroundings are thoroughly clean, and kept so until convalescence is complete, I have made a special care. As my experience has grown and observation extended, I have more and more simplified my technique, using fewer instruments, and relying more upon my fingers. All the time, however, I endeavor to be more rigid in my precautions against sepsis. This requires one to be both exacting and alert.

In my first cases a solution of carbolic acid was used for sponges, instruments, ligatures, the operator's hands, and for cleansing the field of operation. For more than a year I have relied altogether upon thorough, painstaking cleanliness, with boiling water for sterilizing instruments and ligatures.

Prolonged anæsthesia and exposure of the patient's surface are the prime factors of shock: recognizing which, I have striven to operate with increased expedition, aiming to do thorough, careful work rapidly, but not hastily. To accomplish this, preparation for the operation must be complete and the attention of the operator concentrated on his work. I endeavor to work through as small an incision as possible. Introducing two fingers, the nature and extent of the task before the operator are outlined. If, after a careful survey of the field, he decides it to be practicable to remove the diseased tissues or organs, and enters upon the work of removal, only under very exceptional circumstances should he stay his hand until the undertaking is completed. The greatest difficulties are encountered in dealing with adhesions and hemorrhage. Unfortunately the two go together, and to deal with them successfully requires coolness, good judgment, skill, and patience. Above all things, the operator should keep his wits about him, and must not "lose his head." In every instance where fluid, débris, and clots are to be removed, irrigation with the gravity tube should be used. The

cleansing is more thorough and more rapid than by prolonged sponging. To fill the abdomen with hot water counteracts shock and lessens and controls hemorrhage from bleeding points. Hot distilled water is poured into a funnel held above the table, while a rubber tube leads it through a proper nozzle, which the operator's hand directs into every nook and cranny of the deep pelvis and abdomen. Complete removal of the water is unimportant. Before closing the abdomen, I make it a rule to secure, by ligature, any bleeding point in the omentum. I always examine the omentum for such points, and, after making sure that all bleeding is arrested, spread it in its place before proceeding to close the incision.

As my experience has widened, I find that I more frequently use the drainage-tube. This can be seen by referring to the table of cases. I have drained in more than fifty per cent. of my operations. In no case have I regretted its use, while in one case I was compelled to re-open the abdomen after the incision had healed firmly, because I failed to insert a tube. It is a good rule always to drain when one has any doubt as to its necessity. A very small glass tube is best, which, for the first twenty-four hours, should be emptied every hour with a syringe.

In suturing the abdominal incision I use silk, and include all the structures of the abdominal wall, placing the stitches a half-inch or three-fourths of an inch apart. I have not had hernia to follow the operation in a single instance. In one case a small fistula remained at the site of the tube for several weeks, but closed finally without any interference or special treatment.

The after-treatment in my cases has been exceedingly simple. During the first forty-eight hours only sips of hot water are given. If thirst is intense, I give a rectal injection of half a pint of warm water at intervals. On the third day the bowels are moved with a Seidlitz powder or sulphate of magnesia. Broths and semi-solid food are then given in small and increasing quantities. Milk is not a suitable food for these cases; it clogs the bowels and favors gaseous disten-

tion and discomfort. Opium should be firmly and persistently avoided. The patient is much better without it, and besides masking all the symptoms, it does positive harm by locking the secretions, disturbing the stomach, and favoring abdominal distention. The bowels should be kept soluble and open by frequent use of salines. Indeed, it is important always to clear out the bowels thoroughly by repeated catharsis for several days prior to the operation. There can be no doubt that purgation after abdominal section is a supplemental and indirect method of drainage.

In conclusion, I desire to make an earnest plea for earlier interference in abdominal diseases. Here in the South this lesson needs to be impressed firmly upon the minds of the profession. When operations are done in good time, before emaciation and exhaustion come on; before repeated attacks of peritonitis have complicated comparatively easy tasks for the surgeon; before the blood is charged with septic products; then will our results excel those of the present time. It is time for the profession generally to recognize these great advances in abdominal and pelvic surgery, and give the patient the benefit of early operation with its increased safety.

COMPLICATIONS OCCURRING IN THE CLINICAL HISTORY OF OVARIAN CYSTS.

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In the natural history and growth of an ovarian cyst there are impending accidents and complications occurring rendering diagnosis doubtful and operation questionable, permissible, or imperative.

The development of a cyst is, in itself, so pronounced a pathological process, it is but reasonable to anticipate danger. To differentiate the symptoms so arising from those of other peritoneal diseases, and to relieve the pain and immediate distress, are questions of material concern to the general practitioner. The eminently practical surgeon may rest content with a surgical diagnosis—that is, that an operation is demanded—but the truly scientific will prefer to analyze thoroughly the clinical features of the case, deduce his pathological problem, and if an operation is undertaken, his chances of "being surprised," or "meeting with unexpected conditions," are reduced to a minimum. Upon the other hand, by prompt action, or judicious conservatism, we save the life of our patient.

Experience shows that general and subjective symptoms are almost valueless in the diagnosis of ovarian cysts. The entire group of rational and associate symptoms may be negatived by the physical signs. Having determined by physical methods the existence of a cyst—there are events and complications occurring in which to differentiate the clinical phenomena—we are forced to rely almost entirely upon rational symptoms.

In former times, ere yet the eager and expert laparotomist was rife within the land, it was no unusual thing to meet with an ovarian tumor that had seen its days of activity and for years had remained in a stationary and quiescent state. Such lethargy is unheard of now; even if nature were disposed to provide accommodation, the zealous surgeon would break in upon its repose and, like Macbeth, "murder sleep."

The behavior of an ovarian cyst is not governed by any arbitrary pathological law; from the incipiency of its growth, while yet we may mistake it for hydrops follicularis, to its termination it is liable to certain accidents, attributable to the characteristics of the tumor and the peculiarities of the patient.

We may thus divide the complications into two classes: (1) Those affecting the tumor itself, viz., adhesions, twisting of pedicle, inflammation, suppuration, rupture, and calcification, and others of minor importance. (2) Complications due to the presence of the tumor, but not affecting materially the growth itself; under this head we have ascites, albuminuria, marasmus, and intestinal obstruction. Other diseases may be met with, but they are so infrequent that they do not merit consideration. Pregnancy is a decided complication, but not a disease either of the tumor or the result of it.

Adhesions.—With the development of a tumor, and its infringement upon the limited space of the peritoneal cavity, as a natural consequence more or less adhesions are formed. We are told by the most acceptable authorities that there are certain outward signs to which we may attach much reliance in the detection and diagnosis of adhesions. The strongest, broadest, longest adhesions presented to us in any given case of ovarian cystoma is that which binds the tumor to the uterus —that is, the pedicle. We are yet incapable of forming any idea of the length and character of the pedicle. Therefore, it is not presumable that we can apply the rules given by Frederick Bird and Spencer Wells for the diagnosis of adhesions. The clinical history is in some measure a guide, yet I well recall, in my own experience, a small cyst in a woman who had passed through three distinct attacks of peritonitis. The

operation was undertaken with apprehension of formidable adhesions, yet the entire sac came away without the severance of a single band.

Small dermoid cysts are more liable to inflammation, therefore readily contract adhesions. After tapping, adhesive bands form at the site of operation.

Strangulation of the pedicle from torsion or otherwise, causes venous stagnation, and mortification would quickly supervene were it not that adhesions are promptly formed.

Adhesion to a viscus may be in direct apposition. The "immediate" form of Tait, or quite a lengthy, broad, flat, or round band, the "mediate" variety, may attach the cyst. Omental adhesions are by far the most frequent. I have seen the greater omentum attached to the anterior surface and spread out and universally attached like a "monk's cowl" over the entire surface of the tumor.

While it is not the purpose of this paper to deal with the technique of ovariotomy, it may be pardoned if I emphasize some well-known facts in the management of adhesions. All omental attachments must be ligatured, grasped with pressure forceps on the distal side, and omentum cut through between, care being taken to suture or tie and divide all holes in the omentum; it is obvious such openings are but snares for intestinal obstruction. The freeing of a fettered cyst from a viscus is often a most difficult procedure. Such attachments are usually soft and highly vascular. In their separation nothing is better than a sponge (Smith), our aim being to sponge or peel the viscus from the tumor, and not the tumor from the viscus.

The hemorrhage attendant upon the separation of these fine adhesions may be controlled by pressure; if that does not check it, and it is inexpedient to ligate, the salt of iron may be employed. Of course, when practicable, nothing is so secure as a No. $\frac{1}{2}$ silk ligature. Accessible adhesions, even though very extensive, are not considered as seriously complicating the case. It is very much to the contrary when the adhesions are deep down in the pelvis. In their separation we are in

constant danger of injuring bowel, bladder, ureter, or some of the large bloodvessels coursing just beneath the peritoneum.

Another acccident that may befall an ovarian cyst is *rotation of the tumor or torsion of the pedicle.*

The *American Journal of the Medical Sciences*, October, 1888, contains a truly classical article on "Rotation of Ovarian Tumors," from Mr. Knowsley Thornton.

From this and the discussion in the British Gynecological Society, on the report of R. T. Smith's rather celebrated case, and two cases under my own observation, I chiefly gather my information. This accident is met with in every variety ot tumors. The only physical condition necessary is a tumor free from adhesions, and a pedicle of sufficient length. Rotation of ovarian tumors is found in patients of all ages, yet far more frequently in young women, and quite sufficiently often at the time of menstruation for us to associate that circulatory phenomenon as an active etiological factor in its production. Many observers have met with twisted pedicle during pregnancy. Barnes mentions three cases in which rotation was caused by the gravid uterus, which, growing from below impinged upon the tumor, exerting leverage upon the side, thus causing it to turn around. This explanation is quite satisfactory for those cases associated with pregnancy. Tait very ingeniously accounts for rotation by the passage of feces, causing each time a slight rotation of the tumor. From an analysis of many reported cases it appears that rotation occurs just as often on the left side. Mr. Tait's theory will answer only for tumors of the right side.

Doran thus explains the accident in one case: "A little artificial distention of the intestine caused it to press against the tumor so as to push its left side backward, stretching and twisting the pedicle." The same author further says, "still I believe that, as a rule, the twisting of the pedicle is to be explained by the simpler doctrine. The tumor, comparatively free laterally and anteriorly, rotates on its own axis every time that the patient, after walking or lying on her back, turns around and rests on her side."

Peristaltic action of the bowels has been suggested as a cause of rotation. (Stephens.)

When strangulation of the circulation takes place in consequence of the twisting of the pedicle, symptoms of varying severity follow. The intensity of the symptoms is governed, to a great extent, by the degree of strangulation. When there is complete arrest of circulation the symptoms are those of localized peritoneal irritation. Abdominal pain and tenderness, quick pulse, fever, and vomiting, and, in all cases of sudden strangulation, there are grave local and constitutional symptoms described as abdominal shock. Schurnoff considers suddenly developing ascites as indicative of torsion of the pedicle. The tumor itself undergoes certain changes. Generally it enlarges, becomes tense, hard, more elastic, and less fluctuating.

An ovarian tumor with twisted pedicle may be confounded with ruptured ectopic gestation. In the one case we have to guide us the usual symptoms and signs of pregnancy; in the other they are wanting. In one there was a well-defined tumor which, with the onset of the symptoms, became more distinct and even more tense than before. In rupture of the tube from pregnancy the tumor is ill defined, and even less distinct than before rupture. In tubal rupture the collapse is decidedly more marked than we meet with in twisted pedicle. The shock from rupture may pass off, but to recur again with the renewal of the hemorrhage. If a patient survive the first shock, attendant upon rotation of the tumor, the subsequent history is inflammatory. Twisting of the pedicle has been mistaken for intestinal obstruction. The presence of a tumor and symptoms occurring therein, together with the readiness with which the bowels respond to mild laxatives, should eliminate this as a possible error. In consequence of twisting of the pedicle, there is, of course, interference with the circulation, venous stagnation occurs first, arterial pressure continues to force blood into the tumor, rupture of an overcharged vessel follows and we have hemorrhage into the cyst. In this way we may account for the clinical phenomena of enlarge-

ment and tension of the tumor, and no doubt the great shock observed in these cases is largely, if not entirely, due to the hemorrhage which generally follows in consequence of the rotation. This question received liberal notice before the British Gynecological Society. The theory of hemorrhage as the cause of shock was more acceptable to me than the twisting of a functionless pedicle. With rotation of the cyst, and absolute strangulation of the pedicle, as we all have seen, inflammation and gangrene would be looked for as a natural consequence. "It is," says Barnes, "the most common and immediate effect, certainly in some cases, to lead to gangrene." This is not the opinion of that conscientious observer and eminent ovarian pathologist, Doran, nor does it accord with the experience of operators.

"The steps of the process seem to be gradual rotation without symptoms of serious pathological change, then sudden serious symptoms, with rapid increase in the tumor, then decrease or complete cessation of the growth, followed sooner or later by renewed activity." (Thornton.)

The full explanation of all this is, that rotation is a gradual process. When suddenly becoming acute, strangulation with all its clinical phenomena is developed. Now, gangrene does not inevitably occur, as Barnes seems to think; but, as the result of the peritoneal inflammation, adhesions quickly form, and it is now through this adventitious connection that nourishment is to be obtained. The supply of blood being at first only limited in amount, the tumor naturally decreases in size from sheer starvation, and, as we well know from indisputable cases, atrophy and spontaneous cure may in this way take place. Usually, however, adhesions become more numerous, and, later on, the tumor again springs into activity. Under these circumstances the pedicle may atrophy, and even disappear. Such a case would prove highly perplexing to the operator. Bantock, with the voice of an enormous experience, says a tumor so strangulated will contract adhesions; that he had never seen nor heard of a patient dying from twisted pedicle.

Now, to the practical question, What are we to do when we meet with a twisted pedicle? If we submit our patient to immediate operation, we are compelled to operate with her in the condition of shock, if not collapse. This is a disadvantage no operator cares willingly to take upon himself. Knowing that it is exceptional for the patient to die in the primary stage, is it not prudent to adopt the recommendation of Bantock, that it is unwise to operate during shock? Let us wait for reaction, which we are assured will be established.

In consequence of torsion of the pedicle, we have shown that hemorrhage frequently occurs. This bleeding is within the cavity of the cyst, due to rupture of a vessel on the inner surface; the strong peritoneal covering is more resistant, and does not yield so readily to blood-pressure. Hemorrhage into the cyst may be due to other causes than twisting of the pedicle; it is unusual for a patient to die from this cause.

In addition to the hemorrhage and acute symptoms attendant upon strangulation of the pedicle, we may have a condition of equal gravity arising from inflammation and suppuration of the cyst. Peritonitis may assume such an active form that immediate operation would commend itself to us as the only alternative. Suppuration of an ovarian tumor may be due to torsion of the pedicle, to careless and useless tapping, and from traumatisms. In suppuration of ovarian cysts the circumstances are desperate, and fully warrant prompt operative interference.

Rupture of the Sac.—This accident sometimes occurs in consequence of over-distention, suppuration, weakening by papillomatous degeneration, or as the result of violence. The symptoms attendant upon this accident depend upon the size, character, and seat of rupture; the nature of the escaping fluid, and the amount of hemorrhage. If the fluid is non-irritating, and the opening permitting slow leakage, little, if any, reaction may follow. Cysts that have undergone colloid degeneration are prone to rupture. Dr. Mann, in his excellent article on this subject, says: "This colloid material is generally very irritating." The only two cases of ruptured cysts I

have seen contained colloid material. In neither of these was rupture attended by symptoms sufficient for diagnosis. One of the cases occurred in the service of Mr. Meredith, at Samaritan Hospital, London. The omentum, intestines, liver, and spleen were all completely covered with colloid; the cyst had evidently ruptured some time before, yet there were no symptoms of peritonitis. The case was an exceedingly ugly one to manage. An abundance of the colloid matter was left behind, though thorough irrigation was employed. A drainage-tube was not used; she recovered without a symptom.

Papillomatous growths are favorable sites for rupture. The immediate danger in such cases is not great, because the villi prevent free flow of the fluid. The remote danger is in the infection of the peritoneum. For obvious reasons, a monocystic tumor is more liable to rupture than the proliferating glandular or multilocular variety. Some authorities claim that an intra-ligamentary cyst is more liable to rupture than one of true ovarian origin. Any degenerative change in the sac may cause rupture. Dr. Anna Broomall reports at some length a case of rupture due to the violent action of a cathartic. Acute pain, evidences of collapse, and marked change in the form of enlargement, are the symptoms pointing to rupture. If the patient does not succumb to the shock of the accident, she is in imminent danger of septic peritonitis. Immediate operation, with thorough irrigation and drainage, are the imperative demands of the case.

Calcification is sometimes met with in operations. It is scarcely probable that the condition could be even supposed in differential diagnosis.

Ascites.—At some time in the history of an ovarian cyst, it is not unusual to have quite an accumulation of ascitic fluid. It then becomes our duty to "establish direct causal relation between the ascites and the abdominal tumor." (Coe.)

We must bear in mind that there are other causes of free fluid in the cavity than mere irritation of the peritoneum by malignant growths, or pressure from an abdominal tumor; cardiac, renal, and hepatic diseases all give rise to ascites.

We are prone to treat this complication lightly. It is of vital importance, and of immense prognostic value, that we eliminate every other possible cause of ascites before we attribute it to the pressure of the tumor. Some effort at a differential diagnosis by examination of the fluid has been made. Having excluded the usual causes of ascites, we must bear in mind that it sometimes is an associate symptom of other complications occurring in the cyst. Torsion of the pedicle, as we have shown, setting up peritoneal inflammation, may give rise to a rapid accumulation of ascitic fluid. Rupture of an ovarian cyst would give us a sudden and rapid ascites, in which a diagnosis might, under the circumstances, prove quite bewildering. An exploratory operation would be our only means of definitely determining the origin of the fluid.

Papillary cystomas irritate the peritoneum, consequently their growth is nearly always attended by ascites. Colloid carcinoma and sarcoma, and, in fact, all forms of malignant ovarian growths, are so generally associated with ascites that it is considered a leading symptom in their diagnosis. A small tumor with ascites appearing early is strongly indicative of malignancy. If the ascites be from obstructed circulation the liquid will be a limpid fluid resembling water, perhaps slightly colored, containing a little albumin, but no fibrin, and giving no sediment. If the ascites be from peritoneal inflammation the liquid will be thinner, but never transparent—always cloudy, looking like buttermilk and smelling like decayed cheese. If the effusion be from simple serous irritation the liquid will be albuminous—rather clear, though sometimes colored like bile. In the sediment will be found elements of great importance. Large irregular cells may be seen, having a central nucleus, surrounded by a quantity of granulations. The presence of these cells is usually taken as a sign of malignant growth. (*Medical Times*, November, 1885.)

Before a body of so distinguished specialists as I have the honor of addressing, it would be a consumption of valuable time to enter into the diagnostic methods for the detection of ascites. Its presence as an accompaniment of a tumor does

not interfere with operation, provided we may assure ourselves that it is not due to malignant disease (Mann). It is the observation of Coe that such cases rapidly decline after operation. If ascites is due to cardiac, hepatic, or renal disease, drainage will be required, the cause still existing. The tax to the patient's vitality will be very trying.

ALBUMINURIA is a frequent complication of cystoma. The mere presence of albumin in the urine is no uncommon thing, especially when associated with high specific gravity. In such cases the pressure of the tumor is the cause of the disease, and with its removal the albuminuria also disappears, as, for instance, the albuminuria of pregnancy (Bantock).

Albumin in urine of low specific gravity is presumptive evidence of advanced kidney disease, and such patients do not bear operation well. The function of the kidneys should always be carefully considered before operation.

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DISCUSSION.

Dr. W. W. Potter, of Buffalo, N. Y.—Time is getting on, and I will proceed at once to discuss some of the points suggested by the essayists without much ceremony or indirection. The paper read by Dr. Douglas is a most interesting one, and certainly concerns every ovariotomist who is in active work to-day. The complications of ovariotomy are often more difficult and important to deal with than the mere removal of the cysts themselves. The removal of a simple ovarian cyst is usually one of the easiest and simplest operations in abdominal surgery; whereas a complicated ovariotomy may be one of the most difficult. One of the reasons why ovarian operations have become simplified and hence more successful, is because the cases come into the hands of operators earlier than formerly, and there is not so much time wasted with temporizing methods. Operators begin at once to do the surgical part of the work. I mean to be understood as saying that formerly, and within the recollection of most of the men who practise abdominal surgery in this room, it was considered proper to tap a cyst a number of times, after which it would finally dawn upon the surgeon, perhaps, that it was the proper thing to cut it out. The adhesions and other secondary conditions that have been known to occur after repeated tappings, have so complicated their subsequent removal that writers and

students of the subject, almost without exception, now condemn the tapping of cysts previous to the operation for their removal.

Another complication that may occur from tapping is, perhaps, well illustrated by a case related by Dr. Alexander Dunlap, of Springfield, Ohio. His first ovariotomy was made in 1843, soon after Atlee's first case. Dunlap operated on a woman he had been tapping once every two months for two years, taking each time a bucketful of water from her. He studied this then condemned operation, and after careful preparation made it. The woman recovered entirely from the operation, but her kidneys, that had fallen into disuse, so to speak, their action having been diverted into another channel by the repeated tappings, now took on a condition of polyuria that was most extraordinary. This excessive diuresis finally drained away her life. It is a complication that may arise from repeated tappings, but in the present light of ovarian diseases and operations ought not to occur.

The complication of pregnancy is an interesting one, and I have had a little experience bearing upon that point. I have seen cystic disease of both ovaries complicating pregnancy, in which also there was dropsy of the abdomen. One one side there was a tumor that weighed 35 pounds; the other ovary had become cystic, and contained over a quart of fluid. There were at least two or three quarts of free fluid in the abdomen. The large cyst was adherent everywhere. The woman was four months pregnant. I removed both ovaries, tied and dropped the pedicles, but I hesitated as to drainage, though it seemed indicated because of the extensive adhesions, but particularly by the presence of ascites. However, the fear that the presence of a drainage-tube might provoke abortion overcame the favoring indications, and after cleaning out the abdomen I closed it. She went on to complete recovery, was delivered at term, nursed her child, and is now about weaning it. I shall watch this case with much interest in view of Dr. Engelmann's paper this morning. I am curious to know whether this woman will subsequently menstruate, which will soon be determined.

Though my time has nearly expired, I would like to say in regard to Dr. McMurtry's paper this: He spoke, at the outset, that his work had demonstrated to him the propriety of doing abdominal operations at the homes of the patients and apart from an ordinary hospital, or even one especially appointed for that pur-

pose. I think that is a very essential and interesting question to discuss, because it is not long ago that many prominent abdominal surgeons insisted that it was utterly inexcusable to undertake an abdominal operation outside of a special hospital. I do not believe in general hospitals for this work. It is not the place to do abdominal surgery, and I do not even believe it is necessary to have a special hospital in order to reach success in this work. I am coming to believe that one of the ideal places in which to perform abdominal operations is the wayside cottage. That they can be successfully done in the courts and alleys of our larger cities has been demonstrated by Dr. Price. If the home of a patient contains even two rooms, one of them properly prepared beforehand, and the operation is done well and in a cleanly way, with a good, reliable nurse placed in charge, the results will be quite as good as if the operation had been done at a hospital established for that purpose. Furthermore, the plan affords women who most often suffer from conditions requiring these operation opportunities for life, by bringing their possibilities within the reach of their slender purses.

In reference to the technique of the operation, it would almost be the work of supererogation to go into details now. But I was well pleased with Dr. McMurtry's remarks when he alluded here and there, in touching upon his cases, to the preparation and technique of the work, because, when a famous surgeon, who has written an article for a surgical work upon a technical question of abdominal surgery, goes to a case, operates, and violates all his own teaching in the management of that case, it is time for us to iterate and reiterate, to file and refine and discuss these questions until we are all brought up to an *esprit de corps* that will at least save us from such humiliation.

There are many interesting questions that we could discuss, and one of the first importance pertains to the use of opium in abdominal cases. I was early taught to treat almost every abdominal disease, whether surgical or not, with the free use of opium, and it has been difficult for me to change my views; but I have almost gone over to the opposite opinion, and have come to the conclusion that the indiscriminate employment of the drug is doing more harm than good in these cases.

We get tumors earlier than formerly, but in England they are still in advance of us upon this point, and that is one reason,

as Dr. McMurtry says, why the English record of successes is better than ours. If the younger men are taught either to do this work themselves or to send the cases to a competent operator early, we will in America soon attain tha same degree of success as attends the British operators.

Dr. Douglas.—I think from the character of Dr. McMurtry's paper we gather more real information than from volumes of carefully prepared compilations that are but a recital of old sayings that are oftentimes untrue. He has presented us with a report of his work, just what he has done himself, and offers it for criticism. I congratulate him first upon his excellent results because his cases are not selected ones; they are cases which occurred in general practice. Secondly, he has refused none that required operation. And thirdly, he has operated on them wherever he found them. He did not have marble palaces thoroughly antiseptic hospitals in which to place his patients. Therefore, I think he deserves a great deal of credit for the report he has presented to us. There are several cases in the list which attract my attention. Case 8 in his schedule is a suppurating hæmatocele with peritonitis. If we go back a little and read the works of Bernutz and Goupil we have some doubt about the existence of so-called hæmatocele. When the doctor reported his case I asked him to explain its pathological condition, to tell us what he found, and he remarked, just as I expected he would, that he felt inclined to consider the case as one of ruptured ectopic pregnancy. The first laparotomy I performed was in a negro woman. I reported the case, just as he has done, as one of hæmatocele, and subsequently Dr. Mundé, of New York, suggested that it was a case of ruptured tubal pregnancy.

Case 15 was one of uterine myoma, soft and œdematous. Dr. McMurtry developed some very good and excellent points for our consideration in this case. A fibroid tumor is not always, as its name implies, a hard, fibrous structure. We call them fibroid tumors, and this is probably the simplest and best classification. We may say myoma or myo-fibroma, cystic fibroma, all complex terms for one condition, for every tumor has more or less of the same structure in it. He had a myoma of the uterus, it was soft and œdematous. He thought he had an ovarian cyst. Our experience in this particular is very similar. About eight or ten weeks ago I removed this tumor (exhibiting specimen),

now much reduced in size, from a woman. I saw her first in July. There was a large, distinctly fluctuating tumor, which I diagnosed as ovarian cyst. I may say here, incidentally, that I shall never diagnose ovarian cyst in a negro woman again until I cut it out. We do not often see ovarian cysts in negresses. Dr. Buist also diagnosed the case as ovarian cyst: we had all the symptoms and signs of a cyst. The woman refused operation at the time. Several weeks passed on and I was called in again. My diagnosis was different. The tumor had lost its fluctuation, and it was more elastic. My diagnosis then was a soft fibroid. With the assistance of Drs. Buist and others, I opened the abdomen and found a large myoma. When I exposed the growth and placed my hand upon it, it still was elastic and gave a decided impression of the presence of fluid within. I even plunged the trocar into it, but nothing escaped. The omentum was entirely attached to the anterior surface of the tumor. There were a dozen or more veins as large as my pencil coursing across the anterior surface of the tumor. The tumor was attached to the ascending and transverse colon. The attachments were freed without difficulty. As the tumor did not extend into the broad ligament enucleation was not necessary. I clamped it just above the internal os, with the serre-nœud, and while an assistant held the tumor I divided the pedicle, thus removing tumor with both appendages.

I will now call attention to the treatment of the pedicle. It is an exceedingly interesting subject. We were promised a paper on this subject by Dr. Polk, of New York. We regret he has disappointed us. How to deal with the pedicle after supra-vaginal hysterectomy is still a question of great doubt. There are methods which have for their object the external peritoneal treatment of the pedicle, which are far more successful than any modification of Schröder's plan, which is the internal treatment of the pedicle. Dr. Howard Kelly, in the *American Journal of Obstetrics and Gynecology*, has called attention to the fact that he places a number of sutures in the pedicle by which it may be dropped between the walls of the abdomen and not into the cavity—inter-parietal but extra-peritoneal, and that if bleeding takes place a nurse may elevate this pedicle by pulling upon the sutures placed in position. Now, when once you place the pedicle there you must let it remain; a disturbance of it gives rise to

pain and increases the danger of hemorrhage. That is my experience. Dr. Kelly recommends before amputation of the tumor, ligation subperitoneally of the uterine arteries as they run up on the side of the cervix. Gentlemen, will you please tell me how Dr. Kelly can ligate the uterine arteries in a case of disease of this kind? Where are your guides for pathology? He has no assurance that hemorrhage will not occur. The risk is too great. It is not practicable to do this. Now, it seems to me that the best treatment of the pedicle is that adopted by Dr. Bantock. (See Bantock on *Treatment of the Pedicle.*) If you treat the pedicle with persulphate of iron or cautery you favor suppuration, and that is not what you want. In my first hysterectomy I used steel pins instead of delta metal. I used Paquelin's cautery and applied a solution of iron and glycerin to the pedicle. I had suppuration for three weeks. When at last the pedicle came off a funnel-shaped suppurating cavity remained to heal by granulation.

In the case from which this specimen was removed I did not apply anything to the pedicle; the result was highly satisfactory.

Dr. W. O. Roberts, of Louisville, Ky.—Dr. McMurtry emphasizes cleanliness in laparotomies. No one will differ with him on that point. It may even be said that results here depend as much upon cleanliness as upon any one thing. I find that a substance sold under the commercial name of Sapolio serves to cleanse the hands better than ordinary soap. Its single drawback lies in its irritating the skin if used too often, but with Sapolio and a good nail brush one's hands may be quickly, thoroughly cleaned. Nor will anyone deny the importance of water. I do not, however, regard distillation as at all essential. Well filtered, thoroughly clean water contained in scrupulously clean vessels is quite sufficient. As to operating at a private house or an infirmary, I much prefer the latter. I have no infirmary of my own, but strive in all cases to do my work in one or the other of the three infirmaries in Louisville.

I do this, among other reasons, because the nursing at such places is, as a rule, better than that at the command of the large majority of our patients. Many of the nurses themselves have much experience in this particular line of work. They are competent to use the clinical thermometer, the catheter, etc. The

institutions are provided with baths, furnaces, telephones, and many other conveniences which I will not stop to enumerate.

Where the conditions in and about the private house are good and the nurses employed competent, I would not go so far as to say that the results would not also be good. It has so happened that I have done but two operations at the patient's house; one in Louisville, now many years ago. The patient was poor and ignorant and the friends equally so. I found it impossible to keep the latter out of the patient's room. The other case was in a country house some distance away. An assistant whom I left in charge gave a most amusing account of his efforts and their failure to keep the family and neighbors from disturbing the sick woman. No such troubles occur at either public or private infirmaries.

Referring to the use of opium in these cases, I must say my practice is in the main that of Dr. McMurtry, and the same applies to most of my acquaintances who do much abdominal surgery. In the majority of these cases opium in some form and at some time seems to be demanded. I regret to say that I have had very few cases in which an occasional dose of morphine to relieve pain has not been needed. As to the diagnosis of the tumors under consideration, it is safe to say that no surgeon who has opened many abdomens has not also erred in diagnosis. But a little while ago I cut down on an abdominal tumor which I felt sure was an enlarged spleen, but which proved to be sarcoma of the kidney.

Only last week I saw an abdominal tumor in a maiden woman thirty-five years of age, which, according to her statement, had been noticed for a year before. It was a short distance above the pubes, and seemed to be to the right and behind the uterus. The uterus was pushed entirely out—complete procidentia. It measured three and a half inches. After replacing the uterus the growth could be felt behind, and seemed to be attached to the right cornua of the uterus. The perfectly solid feel of the tumor, the want of all sense of fluctuation, etc., were sufficient to satisfy me that it was a pedunculated subserous fibroid. On exposing the growth it turned out to be a unilocular ovarian cyst, lying deep down in the pelvis, and though without a single adhesion, it was with much difficulty that I lifted it out.

Dr. I. S. Stone, of Lincoln, Va.—I feel that the Association

is to be congratulated in hearing such able papers as we have heard to-night, especially the latter two, as they emanate from comparatively young men. I suppose fifty years ago it would have been considered marvellous for any man to attain such results in surgery as are reached to-day. To be as brief as possible, I will say only a word in regard to the first paper, as I have had no experience with the open abdominal treatment referred to by Dr. Hadra. The only useful application I could make of it would be in cases of hemorrhage in the pelvis, for which I at present use sponge packing.

To pass on to Dr. McMurtry's paper, I first thought it was the same old song that I had heard repeatedly before, yet always heard with pleasure and profit. I realize that there are many of us, who, perhaps, are a little slow to understand what is meant by "cleanliness," as well as other details which we have heard mentioned here to-day. When we come to follow Dr. McMurtry as expressed by his own experience, it will be far more difficult for us than it appears now. It is but just to say that he expresses the teachings which have emanated from Sir Spencer Wells and the eminent surgeons who have succeeded him at the Samaritan Hospital in London. All who have worshipped at that shrine do not need further illustration of the methods, which are, in the main, just such as are taught us to-day.

A word in regard to the third paper (by Dr. Douglas), which was certainly a very interesting one, for the reason that plain cases of ovariotomy are among the easiest of abdominal operations which we have to perform. On the other hand, there may be great difficulty when we find universal adhesions. In a few cases I had last year, I felt almost paralyzed when I had these adhesions to deal with.

Reference was made to "twisted pedicle," and high authority was cited to show that the shock which usually follows the accident should be allowed to subside before operating. Now we know that authorities differ as to this, the general consensus of opinion favors immediate operation. The twisting occurs in the absence of adhesions, and as shock is due either to loss of blood into the sac, or to torsion of nerves in the pedicle, we can easily understand that immediate operation should give better results than would follow indefinite waiting. We know that to wait for the subsidence of shock in grave abdominal injuries means that

we must expect peritonitis, and in this particular accident adhesions will probably form at once.

Finally I would say that the absence of adhesions enables an operator to deal with these tumors quite promptly. I once saw Dr. Martin, of Berlin, remove one in seven minutes. Dr. Engelmann can bear me witness, as he was present.

Dr. W. H. Wathen, of Louisville, Ky.—I was pleased with the papers this afternoon by Drs. McMurtry and Douglas; they simplify matters connected with abdominal surgery that are not entirely appreciated by men engaged in this work. It will not be necessary for me to talk further about the necessity of cleanliness, for Dr. McMurtry has said all that is necessary on that point.

There are two faults with operators in abdominal work to which I desire to allude, viz., some open the abdomen when they ought not to; others delay operation until it is too late to do any good. I will cite instances in my own State.

A few days ago a very distinguished gentleman was shot through the bowels. An eminent surgeon, well known throughout the country, who has written on intestinal surgery, was called, and did not operate until about thirty-six hours after the accident, when operation gave few chances of success. I do not wish to pass criticism upon the method of operating, but the man died within a few hours. In another case which I saw quite recently the operation was delayed when it ought to have been done, and death was the result. I will relate another case where I was called in consultation with a physician to see a woman with a fibroid tumor weighing 15 or 20 pounds. She was able to attend to her work, so that she suffered no well-marked inconvenience. There was no great disturbance with the bladder or rectum, some constipation—in short, as little disturbance as any of you can imagine in a patient having a tumor of this size. The tumor had not grown for several years, and hemorrhage was not a factor. I could not give my consent to an operation because the dangers attending it were greater than the advantages to be derived from it. This poor woman was operated upon and died a few minutes after getting her back to bed. Hysterectomy was done. These are instances where operations were delayed until no benefit could be derived, and where an operation was done when it ought not to have been done.

Again, I was called to the country a few months ago to do an ovariotomy. When I reached the patient I found that instead of having an ovariotomy I had to deal with an extra-peritoneal hæmatocele extending up the right side to the liver. She had obstruction of the bowels for ten days. I opened the abdomen and found the bowels in nearly a gangrenous condition. She died that night or probably the following day. The hæmatocele was caused by ectopic pregnancy. The operation could have been performed two weeks previously without difficulty and the woman would have made an uninterrupted recovery.

Dr. George J. Engelmann, of St. Louis.—I wish to express to the authors the pleasure which their papers have given me; but the gentlemen have brought such a wealth of material that if you ask me to discuss their papers I will say that I regret that they did not take up one or two subjects and give us the results of their experience somewhat more in detail. Many important points have been touched upon; one which attracted my attention was the operation of laparotomy for tubercular peritonitis. It seems strange that by opening the abdominal cavity, washing it out, and dusting the peritoneum with iodoform we should cure a tubercular disease of the peritoneum; yet excellent authority is cited in defence of the operative procedure. I have not succeeded in cases of true tubercular peritonitis, *i. e.*, showing the bacillus.

Quite recently I had a case of this kind which took precisely the course I should have expected it to take: the patient improved temporarily, but died within six months. I opened the abdominal cavity, washed it out, and dusted the serous surfaces with iodoform. The patient felt much better for six months, then died. If these cases were sifted more carefully it would be found that the bacillus was *generally not present* in those which recover. We may have small nodules or inflammatory deposits in the peritoneum which are not necessarily tubercular, yet we call them so by habit, because they are nodules, tubercles; but the bacillus of tuberculosis is not always present, and in only a few cases has it been found. It is certainly proper when any one of us has a case of this kind, to excise a few of the tubercles and submit them for microscopical examination. It seems extremely strange to me that we should be able to cure the disease if the bacillus is found. The tubercle or nodule is an inflam-

matory product, and if we operate early we can perhaps prevent the bacilli from developing in these inflammatory deposits; we shall succeed and a cure may take place.

With regard to the twisting of the pedicle, I will say that the expression I have heard this evening that these cases are not necessarily dangerous is new to me. My experience has been to the contrary.

I recall a striking case occurring in the practice of a friend in which post-mortem examination—this was before the days of antiseptic laparotomy, hence no operation was performed—showed that the pedicle had been twisted, had necrosed, and as a consequence the tumor was free in the abdominal cavity. Dr. Brokaw, who recalls the case, says that it was not an ovarian, but a dermoid cyst.

In another case in which I operated, after sepsis had existed for some time, death followed. In still another, twisting of the pedicle was followed by rupture of the vessels, hemorrhage, disintegration, sepsis, and death.

Dr. Virgil O. Hardon, of Atlanta, Ga.—Not long ago I heard one of the most prominent laparotomists in this country say that no man had a right to perform abdominal section outside of a hospital especially used and adapted for that purpose. He said that to operate outside of such a hospital was bad surgery, bad policy, bad humanity. I am glad to hear Dr. McMurtry say what he said in his paper, because it accords so fully with my own experience in that regard. A considerable proportion of my laparotomies have been done upon the very lowest classes of negresses, who came to my college clinic—patients who live in little hovels, surrounded by all the filth incident to their social condition, etc. I have never lost one of these patients after laparotomy, and I am inclined to think that we are apt to get better results in such places, because the ventilation is more perfect and there is less liability to septic infection than when we operate in the houses of patients of the better class.

I have been struck with the fact that these patients do as well, and in my own experience better, than those operated upon in the houses of the better class or in my own private hospital, because I have never lost one of the poorer classes of patients, while I have lost some under other circumstances.

I want to refer to one of the details relative to the technique of

abdominal section. There is one point that has impressed me forcibly—although I have not seen it referred to in the literature of the subject—and that is, it makes a difference in the prognosis of our cases as to what time in the day we operate. I believe it is the practice of some German operators to operate early in the morning—as early as seven o'clock, or even before. That is good practice and good policy, and should be recommended, for the reason that the patient has better chances to recover from the effects of the anæsthetic, to get over the nausea and uncomfortable symptoms which follow the operation as a result of anæsthetics. I have found that my patients when operated on early in the day will get more or less sleep during the night which follows the operation. In those cases where I have operated late in the afternoon I have invariably found that the patient did not sleep at all during the following night.

Dr. W. D. Haggard, of Nashville, Tenn.—During the entire session of this Association I have listened to no more practical papers than those now under discussion. The paper of Dr. Hadra, I confess, is to me a revelation. The leading idea in all surgical teachings hitherto has been to close the abdominal wound as speedily as possible, but the doctor's success shows his new departure to be a justifiable and rational procedure.

I was deeply interested in the paper of Dr. McMurtry. Perhaps my interest was heightened by the fact that I see in the hall a large number of medical students who have been in constant attendance, and I am satisfied heard no more practical or profitable paper. The positive manner in which he emphasizes the importance of cleanliness in abdominal surgery generally, but especially in the technique of the operations he has performed, has no doubt impressed the minds of the students, as well as the Fellows of the Association, with the fact that his success has largely depended upon this fact. I was deeply impressed with the report of his cases, but more especially with his operation for tubercular peritonitis. We all know that the development of tubercles in any part of the human organism is nothing more nor less than an expression of a constitutional disease. If abdominal section, followed by washing out the cavity with an antiseptic fluid, followed by sprinkling the peritoneal surface with iodoform, will add to the span of life, the operation is certainly to be commended. But that the presence of tubercles on the surface of

the peritoneal membrane may be mistaken for inflammation of the peritoneum with nodules scattered all over its surface closely resembling tubercular deposits I think probable. In either case, however, the operation marks an advance in abdominal surgery undreamed of a few years ago.

Coming now to the paper of Dr. Douglas, I consider it one of the most valuable contributions I have heard, prepared, as I know it to have been, under great disadvantages. The complications and degenerative changes which an ovarian tumor may undergo, when present, are always embarrassing to the operator, and affords one important reason among the many for early operative procedures.

Dr. G. Frank Lydston, of Chicago.—I was particularly interested in the papers that have been read. The paper of Dr. Hadra is somewhat peculiar, however.

One speaker emphasized the point as to the amount of judgment required in deciding upon the extent of the incision. I think that a great deal depends upon this. I have seen operators who, in removing diseased ovaries in which there were few or no adhesions, make very large incisions into the abdomen, while I have seen others attempt to remove a widely adherent tumor through a small opening.

With regard to antisepsis there has been a good deal of discussion *pro* and *con* as to the proper antiseptic that should be used in the abdominal cavity. One says that he does not believe in antiseptic drugs, another says bichloride of mercury is used by him, and still another uses carbolic acid. Now, it has been shown conclusively, I think, that it is not the form of antiseptic that counts, but it is the removal of the material upon which the germs may feed. It is not the germs primarily in wounds that cause the trouble, but the evolutionary products of germs which do damage, and by and by a particular type of germ is developed which is specific in its intensity, and from such germs we have typical results. If a germ has no pabulum upon which to feed then it must die of inanition. This I believe to be the keynote of aseptic and antiseptic surgery.

Dr. R. M. Cunningham, of Pratt Mines, Alabama.—There is one point of which I would like to speak, and it is this: There is a difference, in my opinion, in the susceptibility of septicæmia in the two races, Caucasian and negro; greater in the former, which

explains the difference of opinion entertained by distinguished laparotomists, and which harmonizes with the success of Dr. Hardon, most of his cases being negro women. Three things have particularly impressed me in regard to wounds of all kinds in the negro race, namely, incised wounds heal kindly; lacerated wounds do not heal kindly, and negroes are not as liable to septicæmia as the Caucasian race. My views are based upon my experience. Abortions are quite frequent among a certain class of negro women, many of whom do not have any physician, and yet septicæmia is rare, when compared with white women. Anyone who is familiar with the exceedingly filthy home and personal hygiene of the average negro woman when confined, their prejudice against the use of water and cleanliness, and the comparative rarity of puerperal infection among them, I think will agree with me that as a race the negro is not so susceptible to septic infection.

Dr. Hadra.—It must have been my own fault if you failed to understand what I proposed in my paper. Of course, I do not wish you to believe that I advocate leaving the abdomen open in every laparotomy. I distinctly said that my proposition aims at such cases in which the operations in use have given no satisfaction, that is, in acute diffuse purulent peritonitis. Everybody, for instance, knows of the poor results in putrid peritonitis in childbed. I think we are somewhat misled by the glorious reports of the ovariotomist, and that we lose sight of the unsatisfactory results obtained in those cases under discussion. Especially when the bowels are very much distended we must seek for other methods instead of crowding them back, because even after incising them not much will be gained. As long as I am not convinced of the irrationality and infeasibility of my plan I will hold to it, satisfied that it will—perhaps when modified and improved—give results as good as can be reasonably expected.

Dr. John Brownrigg, of Columbus, Miss.—I am somewhat in doubt as to one or two points made by Dr. McMurtry. He reports in his paper twenty cases, and it seems to me he had treated other cases, if I understood him correctly. I would like to ask if the twenty cases were consecutive?

Dr. McMurtry.—Yes, sir.

Dr. Brownrigg.—I would like to ask whether he met with equal success in the other cases?

Dr. McMurtry.—Yes, sir. This report includes all the deaths I have met with up to the present time.

Dr. Brownrigg.—Then I must say your success has been remarkable.

Dr. McMurtry.—I want to say that all those who have read Dr. Hadra's contributions to gynecological literature know they are instructive, and I think the whole trouble with the members in not fully understanding his papers has arisen from the fact that the paper was not worded in its title so as to be clearly understood. I believe that if he had entitled his paper "Abdominal Section and Drainage in Purulent Peritonitis," or something to that effect, it would have conveyed the idea more clearly to the Association than it did.

His suggestions for the treatment of purulent peritonitis are based upon sound surgical principles. They are the accepted principles of to-day in abdominal surgery, namely, that we should treat a suppuration within the abdomen just exactly as we would treat a suppurative knee-joint: open it, evacuate the pus, cleanse the serous membrane and thoroughly drain it.

Mr. Greig Smith, in the last edition of his work, advocates this plan of treatment, and recommends using a solution of glycerin and water on account of the hygroscopic qualities of the glycerin, and keep the intestines afloat for days, so that they will not become adherent and form pockets, which they are sure to do if allowed to remain in contact.

I would like to say a word in regard to the remarks made by Drs. Engelmann and Haggard with reference to tubercular peritonitis being treated by abdominal section. It will be remembered that in my paper I stated that there is no scientific explanation whatever for the results we get in these cases. Dr. Haggard misunderstood the case of Sir Spencer Wells which I mentioned, who states in the last edition of his work that twenty-one years after operation on a patient, wherein he found the peritoneum studded with myriads of tubercles, the woman remains in good health. In one of my own cases the patient, now past sixty years of age, is in good health and activity three years after abdominal section.

In reply to Dr. Engelmann, I would state that I made no investigation as to the histological character of the neoplasms found in my cases, but I am quite satisfied it was tubercular. I

am sure it was not any form of inflammatory exudate. Both parietal and visceral peritoneum were studded with miliary tubercle. Greig Smith states that these cases have been examined microscopically and the tubercle bacillus found. There can be no doubt as to these facts.

As regards the operation being done at the homes of the patients, I would say that all but two of my cases were operated upon at private homes. Some were done in elegant homes where there was every convenience and comfort; while others were done in cottages where conveniences were limited. I maintain that this class of surgical cases can be treated as successfully in their homes as in any special hospital, and more successfully than in most hospitals. Indeed, I claim that an airy room in a salubrious house is the ideal place for abdominal operations. Increased experience has simplified the operative technique, and when the work is done thoroughly and skilfully there is very little required in the way of after-treatment. Beyond the care of the drainage-tube there is very little for the nurse to do.

I want to express my appreciation of Dr. Douglas's paper. It presented scientific explanations of clinical facts, such as I have never heard so thoroughly cleared up before. I was struck with his remarks upon the diagnosis of uterine myoma. His experience was such a complete duplication of my own that I was prepared to appreciate the thorough accuracy of his observations. I indorse his views in regard to the treatment of the pedicle.

Dr. Douglas.—I want to say in answer to Dr. Stone that in cases of torsion of the pedicle, when your patient is in a state of shock, that shock, according to Bantock, is due largely to hemorrhage within the sac, that that hemorrhage is from the nature of things limited in amount, and that the patient will not bleed to death—at least he has never seen a death from hemorrhage in such cases. If it is due to a limited amount of hemorrhage the doctor claims that reaction will take place, when an operation should be undertaken, and not at the time the patient is suffering from shock and collapse, which we are forced to do in cases of tubal pregnancy.

TROPHO-NEUROSIS AS A FACTOR IN THE PHENOMENA OF SYPHILIS.

By G. Frank Lydston, M.D.,
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In studying some of the late or sequelar lesions of syphilis, particularly those involving changes in the osseous structures of the head and face, I have been forcibly impressed by certain characters of the lesions which seem to depend upon a more occult series of pathological changes than those to which they are usually accredited. Some of these characteristics pertain also to many of the lesions of the active or secondary period of syphilis.

The relation of certain syphilitic phenomena to organic or functional disturbances of the nervous system—and particularly the sympathetic system—is certainly manifested here and there along the whole line of morbid phenomena developed in the course of the disease. The syphilitic fever, so called, while an inconstant phenomenon, is present in a sufficient number of cases of the disease to settle practically the question of the relation of cause and effect. The symptoms which collectively we designate syphilitic fever, are, in common with some other febrile constitutional disturbances, undoubtedly dependent upon the action of a special poison upon the sympathetic nervous system. It is logical to infer from what we know of the physiology of the sympathetic system, and particularly of those functions of the sympathetic which we term trophic, that the majority of fevers—if not all—are directly dependent upon the action of the specific poison upon the sympathetic ganglia, which action is manifested by dis-

turbed metabolism and the resulting phenomena of fever. So in the case of syphilis the poison may produce so profound an impression upon the sympathetic ganglia that the trophic function of this portion of the nervous system is disturbed, with an attendant perversion of tissue metabolism, a resultant excessive production of animal heat, and the accumulation in the system of the toxic products of perverted physio-chemical change. The fact that the so-called syphilitic fever is not a constant phenomenon, but affects only a certain proportion of individuals attacked by syphilis, is explicable upon the ground of idiosyncrasy.

The argument that the syphilitic fever is the result of an impression produced by the syphilitic poison upon the sympathetic nervous system does not necessarily imply—nor do I intend it to do so—that the syphilitic fever is a part of the natural course of the disease. On the contrary, I believe that it is accidental and the result of idiosyncrasy. We know that different individuals are variously affected by the constitutional impression of organic poisons. Certain individuals are affected by urticaria or erythema upon the ingestion of shell-fish, this result being particularly apt to follow when the particular article of food is not perfectly fresh or was not in an absolutely healthy condition when taken for food. Some persons are seriously affected by the ingestion of certain vegetables—particularly if partial decomposition has occurred. Canned vegetables, and especially tomatoes, are especially liable to impeachment upon this ground. If it is fair to infer that by virtue of idiosyncrasy the nervous system of certain individuals may be morbidly impressed by certain food substances which are innocuous to the majority of individuals, it is certainly fair to assume that in the case of so powerful an organic poison as that of syphilis, with which a larger number of individuals are inevitably inoculated, certain special and exceptional phenomena may be produced in some persons.

Attendant upon or following the syphilitic fever, or occurring independently of it, we have a characteristic manifestation of syphilis, which in cases unmodified by treatment is

probably always present in greater or less degree. I refer to the syphilitic roseola. This eruption has been shown to be unlike the other phenomena of syphilis in that it is dependent, not upon a localized collection of proliferating syphilized cells, but upon vaso-motor disturbances, the essential objective element of which consists in dilatation of the capillaries in localized areas of the skin. This, as far as we are able to determine positively, is dependent upon the impression of the syphilitic poison—virus, bacillus, degraded cell, or whatever term may be selected to designate it—upon the central sympathetic system. This impression is essentially the same as that produced by certain vegetable poisons. It is not, however, dependent upon idiosyncrasy, although it may be modified by it; thus we find in some individuals a very marked roseola, in which the lesions are disseminated over a large area of the integumentary surface and are very prominent and well defined; whereas, in others we may find upon close inspection perhaps but a single lesion. The gradations between the two extremes are very various. Idiosyncrasy might be quite plausibly advanced as the explanation of this wide variation.

The action of certain drugs given for medicinal purposes is a further illustration of the results of various poisons upon the sympathetic nervous system as manifested by the appearance of morbid cutaneous phenomena. Belladonna, quinine, opium, copaiba, chloral, salicylic acid, and numerous other drugs have been found to produce, in exceptional cases, an efflorescence upon the skin. The rarity of such phenomena, in conjunction with other proofs of idiosyncrasy and the known properties of these various drugs, as far as their action upon the skin is concerned, are positive evidences of their neurotic character.

The lesions of syphilis which succeed the roseola have been so positively demonstrated to be dependent upon a localized deposit and proliferation of syphilized cell material that it would appear to be impossible to apply the neurotic theory to them. It is only necessary, however, it appears to me, to

direct attention to the marked symmetry which characterizes the peripheral phenomena of syphilis to suggest at once the probability of a central nervous element in the production of the various lesions. It is, to be sure, admitted that a symmetrical development of eruptive lesions occurs in some other affections. It will be found, however, that a nervous element is either positively demonstrable or the skin lesions are so abundant and general that it would be impossible that they should be otherwise than symmetrical.

As a most positive proof of the relation of eruptions of the skin to nervous disturbance of a presumably trophic character, I have but to allude to herpes zoster. In this disease we find an accurate delineation of the course of the affected nerve by the eruption, and a very manifest local disturbance of nutrition of the affected tissues. Generally some portion of but one side of the body is affected by this disease. It is sometimes bilateral, and consequently of a more serious character than usual. Some of the later lesions of syphilis are unilateral, and, as will be shown by a case shortly to be related, almost as plainly referable to the distribution of a particular nerve, as is the case with herpes zoster.

Professor Otis, following Besiadecki and others, has shown that the predilection of syphilitic material for the papillæ of the skin is due to the fact that it is at this point that the arterial, venous, and intervening lymphatic capillaries come into the most intimate contact—in other words, that it is in the papillæ of the skin that the narrowest points in the circulatory and lymphatic flow are to be found. The affinity of the syphilitic process for lymphatic structures explains the rest, and we have at various points in the superficies of the body a localized heaping up of the so-called syphilized cells. We have, however, in the roseola, localized and circumscribed phenomena, which are not satisfactorily explicable upon anatomical grounds. Why does not the roseola appear in one continuous blush over the entire surface of the body? Is it not because the impression of the syphilitic poison upon the system is manifested through a vaso-motor disturbance of the

function of the sympathetic ganglia at certain terminals in the skin? Dr. Otis accepts the neurotic origin of the roseola, and it is a matter of surprise that he should seek for a local anatomical explanation of the development of, for example, the syphilitic papule. In view of the logical explanation of the roseola, would it not be fair to infer that a similar condition of affairs prevails in the case of the other eruptions?—*i. e.*, that as a consequence of an impression made by the syphilitic poison upon the sympathetic ganglia, their trophic functions are disturbed, with a consequent disturbance of nutrition and perverted tissue building at certain points upon the periphery or superficies of the body? I do not know whether this explanation of the secondary eruptions of syphilis has ever been advanced, but it has for some time appeared to me to be the most logical explanation of the phenomena of syphilis. It is particularly satisfactory from the fact that it covers not only the roseola and papule, but every other lesion which may occur throughout the entire course of syphilis.

There is, perhaps, no morbid phenomenon characteristic of active syphilis which is more difficult of explanation on purely mechanical grounds than the alopecia which occurs during the secondary period. Very few cases, if any, which are unmodified by treatment, escape this disagreeable symptom of the disease. Indeed, under the most careful and scientific treatment a greater or less degree of alopecia is frequently observed. The shedding of the hair is limited chiefly to the scalp. The eyebrows are affected, but the beard is little, if at all, involved, as a rule. Other hairy parts of the body are not generally involved, even though there may be quite a general eruption over the surface of the body. Should destructive lesions occur in any situation supplied by hair, a temporary or even permanent shedding will be likely to result. The manner in which the hair is shed from the scalp is most striking and characteristic in most cases; instead of there being a general shedding, the process seems to affect the scalp in spots, as a consequence of which the head assumes an embarrassing piebald appearance, which he who runs may read. Otis, and

others, attribute this alopecia to an accumulation of syphilized germinal material in and about the hair follicles, this deposit producing mechanical impairment of nutrition of the hair, as consequence of which it is cast off. Strange to say, however, if this theory be correct, lesions of the scalp of sufficient prominence to attract attention are quite rarely associated with alopecia. A few small papules, pustules, and crusts are occasionally found, but hardly ever in sufficient amount to account for the extensive falling off of the hair. It will be found, to be sure, that at the site of such lesions the hair invariably falls out. Now, it seems to me, that if the syphilitic material had such an affinity for the scalp as would be indicated by the theory of localized cell deposit, the cutaneous lesions of this portion of the integumentary surface would be especially pronounced. It is hardly probable that in the presence of such an affinity for the hair follicles a deposit of syphilitic material would accumulate to such an extent as would be sufficient to deprive the hair follicle of nutrition, and yet fall short of a sufficient amount to be perceptible externally. There may be, it is true, more or less accumulation of germinal material in the hair follicles, but there yet remains the necessity for an explanation of its deposition in this location.

From these considerations I have been led to believe that the alopecia of syphilis is precisely similar to that which occurs in other diseases, as a consequence of local malnutrition incidental to disturbed nervous supply and general malnutrition. In certain fevers, for example, shedding of the hair is quite common during convalescence—perhaps well along in the period of convalescence. This is due to a general perversion of nutrition, which must necessarily affect an epidermal structure of a low grade of vitality, such as the hair. This perversion of nutrition is, in my opinion, due, to a greater or less exent, to disturbance of the functions of the sympathetic nervous system—in other words, to a trophoneurosis. Various morbid disturbances of the nervous system are known to affect the vitality of the hair. Thus, fright has

been known to induce a blanching of the hair, unquestionably dependent upon perversion of the functions of the sympathetic ganglia. Neuralgic affections of the head are well known to produce both blanching and falling of the hair, perhaps limited to the distribution of the terminal filaments of a single nerve. As a further illustration of the relation of malnutrition, probably dependent upon perversion of the functions of the sympathetic nervous system to falling of the hair, may be mentioned the alopecia resulting from the excessive use of arsenic internally.

The relative immunity which the beard of the male enjoys, as compared with the hair of the scalp, is probably dependent upon the greater intrinsic strength of the hair growth and the higher vascularity of the tissues of the face.

It would appear that syphilitic infection not only has a peculiar affinity for the sympathetic nervous system, but that this affinity is particularly marked in the case of the upper or cervical portion of the sympathetic. The proportion of lesions about the head, face, and mouth is relatively much larger, even under the best of treatment, than in other portions of the body. The parts supplied by the fifth cranial nerve appear to be particularly susceptible. Very many of the cases with which I meet in private practice escape under appropriate treatment general cutaneous eruptions. Few, indeed, no matter how thoroughly they may be treated, are not affected at one time or another with lesions of the lips, inner surface of the cheeks, tongue, throat, and scalp. I find that falling of the hair, sore throat, and mucous patches are to be anticipated, in spite of the most careful treatment, in the larger proportion of cases. I have had in my experience very few cases in which, with conscientious attention to treatment, the patients have been annoyed by cutaneous eruptions, bone lesions, etc., but I have had a number in which oral and pharyngeal lesions proved a source of great annoyance. Even in the late and sequelar syphilides this same predilection for the structures of the face and throat is manifest. Cases are frequently met with in which the initiatory and active periods

of the disease have been passed through without serious trouble, when, suddenly and without warning, serious destruction of the nasal, palatal, and maxillary bones has developed. Many cases of serious destructive ulceration of the pharynx are met with as remote manifestations of syphilis in cases in which annoyance has been escaped during the earlier periods of the disease.

The affinity of the syphilitic process for the iris may possibly be explicable from the important function of those filaments of the sympathetic system supplied to this part; in other words, the local accumulation of cells in the iris may be incidental to disturbances of nutrition dependent upon the impression of the syphilitic poison upon the central sympathetic system.

Even in congenital syphilis we can see evidences of trophoneurotic disturbance. The peculiar affinity of the syphilitic process for the epiphyso-diaphysial junction of the long bones is strikingly suggestive. It is here that the processes of growth and nutrition are most active, and tissue-building the most rapid. It is, consequently, at this point that disturbance of the trophic function of the sympathetic, which presides over the physiological processes of nutrition and growth, would be most likely to be manifested by pathological change. A perversion of the function of the sympathetic would result in imperfect differentiation of the cells of the part, and as the rapidity of proliferation of cells is in inverse proportion to their degree of differentiation, a heaping up of the young material is to be expected. Associated with this imperfect differentiation of cells we have a tendency to degeneration, for it may be formulated that the tendency to degeneration is also in inverse ratio to the degree of differentiation. This imperfect differentiation, with a consequent tendency to degeneration of young germinal material, is the characteristic feature of all the lesions of syphilis, no matter in what stage of the disease they may develop.

The physiological effects of the remedies upon which we depend for the cure of syphilis are evidences of the neurotic

character of syphilitic phenomena. It is shown that mercury and iodide of potassium, although very efficacious in syphilis, are in no sense directly curative, their beneficial effects being dependent upon their power of inducing fatty degeneration and elimination of the products of the syphilitic process, rather than upon any special controlling or antidotal effect upon the poison *per se*, whether this poison be a virus, germ, or cell. In reviewing the opinions of our best syphilographers regarding the treatment and prognosis of syphilis, one is impressed with the idea that syphilis is a disease which runs a natural course in spite of treatment, the physician being incapable of doing more with his remedies than to remove the effects of the disease as fast as they appear, thus preventing, as far as possible, permanent damage to the affected tissues. As far as aborting the natural course of the disease is concerned, he is absolutely helpless, and apparently his success in the treatment of the disease is inversely to the vigor of his attempts to antidote or stamp it out.

If the neurotic theory of the essential condition in syphilis be correct, we have, in our efforts to discover a specific remedy for syphilis, been necessarily led away from those lines of research which would lead to a correction of the principal element in the production of the syphilitic phenomena. The severity of the results of syphilis would appear to depend (1) upon the individual susceptibility of the nervous system of the patient; (2) upon his constitutional condition, and, incidentally, on the resisting power of his tissues; (3) upon the action of remedies, this being by no means the most important consideration.

The involvement of the fauces and pharynx characteristic of secondary syphilis has been explained upon the ground of lymphatic engorgement, the primary cause of which is the abundance and superficial character of the lymphatic capillaries of the affected parts. It is a noteworthy fact, however, that there is but little swelling, pain, and tenderness accompanying the syphilitic sore throat, provided ulcers be absent. There is, also, in the early part of the disease, little or no

tendency to ulceration in the majority of cases. There is comparatively little heaping up of syphilitic material. These characters would lead one to suppose that there is something behind the localized proliferation of cells—if such exist—something, too, which will explain the appearance of morbid phenomena at this particular point aside from mere anatomical peculiarities. For obvious reasons it has not been clearly shown whether the same efflorescence and engorgement do not occur in the other portions of the alimentary canal in the early period of syphilis. Admitting that there is a diffuse accumulation of cells in the pharyngo-faucial tissues, there should be something more than local anatomical peculiarities to explain it. Is it not a result of vaso-motor changes similar to those which prevail in the roseola, and which are due to the impression of the syphilitic poison upon the central nervous system? The same condition, in all probability, prevails in other portions of the alimentary tract, which are, as is well known, intimately associated with the sympathetic nervous system. It is only at this point, however, that the parts affected are so superficial as to be open to observation. At this point, moreover, causes of irritation are more prevalent than in other portions of the alimentary tract. The food which is swallowed; rapid changes of temperature incidental to the function of respiration or to the ingestion of fluids at various temperatures; the use of the voice, the contact of irritating secretions from the nose, and the inhalation of irritating substances from the atmosphere, might quite rationally be expected to contribute to the tendency to localization of the syphilitic process in the throat. In the presence of such local causes of irritation, vaso-motor disturbance incidental to the impression of the syphilitic poison upon the central nervous system might be determined at this point, while absent in every other situation.

As we have seen, the vaso-motor impression which underlies the development of the roseola is substituted later on for a more or less pronounced trophic disturbance, as manifested by the heaping up of neoplastic material, the development of

pus, the occurrence of ulceration, etc. *Pari passu* with the supervention of this trophic disturbance in the case of the skin, we have a similar state of affairs in the pharynx and mucous membrane of the mouth, as manifested by the development of mucous patches, ulcers, and macular eruptions, the latter being particularlarly marked upon the roof of the mouth.

On careful observation of successive crops of lesions in syphilis, it will be found that the tendency to destruction of tissue and to the involvement of various important functions of the body grows more pronounced as the case progresses. We see, therefore, in watching a case from its inception, the gradual supervention of a trophic upon a vaso-motor disturbance, and as the case progresses this trophic aberration becomes more and more pronounced, until, finally, in the period of so-called sequelæ, we have marked destruction of tissue in various situations—a destruction so marked as to have led to the impression at one time that the syphilitic poison produced in such instances corrosion of the tissues. In the absence of a corrosive power of the syphilitic poison—and, as we know, its infectious properties decrease as the case progresses—the only logical explanation of the serious effects of late syphilis is the theory of tropho-neurotic disturbance.

Let us glance at the series of morbid phenomena in a typical case, and the truth of the foregoing assertion is at once apparent.

First, we have a macular eruption, or perhaps an efflorescence of the skin, which is not at all raised above the surface. This (the roseola) does not produce any destruction of tissue. Later on, we have the development of papules; a little later in the natural order of succession, pustules, perhaps followed by ulceration. Still later, we have marked ulceration of an ecthymatous, or, perhaps, rupial, character; interspersed with these various later lesions, or occurring alone, we may have a development of scaly lesions—sometimes tubercular syphilides. Coincidently with the papules we have the appearance of sore throat, followed later on by mucous patches, and perhaps ulceration. As the case progresses, the bones may be affected;

iritis may occur; well along in the period of sequelæ necrosis of the bones may develop. It will be found that as the intensity of the infection diminishes, the tendency to suppurative processes and to destruction of tissue increases. The later lesions are found to be frequently associated with disturbance of a known nervous character, cerebral syphilis in its various forms being quite apt to occur.

The exceptions to the gradual increment of severity of syphilitic lesions are so unusual that they are now designated as precocious. Malignant or precocious cases of syphilis are explicable, in my opinion, upon the theory of idiosyncrasy.

It is in the later secondary and sequelar lesions of the disease that the apparent tropho-neurotic character of the manifestations is most pronounced. I had long been impressed with the peculiar course of some of the osseous lesions of late syphilis, particularly those affecting the head and face. It had seemed to me that the destructive effect exerted by the morbid process upon the bony tissue was greatly disproportionate to the objective and subjective phenomena which preceded the actual destruction. For example, I think that upon reflection it will be found that the objective morbid phenomena which precede the necrosis *en masse* of various portions of the palate, superior, maxillary, and nasal bones, are comparatively slight when we take into consideration the fact that the affected bone is entirely destroyed. Indeed, it often seems that the first objective phenomena perceptible in cases of necrosis of the parts mentioned are incidental, not to destruction of the bone, but to an attempt on the part of nature to rid the tissues of offending foreign material. Thus, I have observed cases in which the greater portion of the palate was entirely destroyed, yet very little manifestations of trouble were apparent until suppuration occurred with a small point of ulceration of the soft parts covering the bone and the discharge of a small quantity of pus—a quantity, by the way, so small as to be entirely disproportionate to the extent of the morbid process. On passing a probe into the small sinus thus formed, one who is not thoroughly conversant with the pecu-

liarities of such conditions would quite likely be surprised to find that a large portion of the bone is dead, and perhaps loose in the tissues. It will be found, upon observation of processes other than syphilitic which produce necrosis or caries of bone, that there exist, prior to the death of the osseous structure, quite pronounced objective phenomena in the way of pain, swelling, and deformity of the part, these symptoms indicating the existence of proliferated inflammatory material, which subsequently produces, by simple pressure, destruction of the vitality of the bone. Those morbid phenomena in syphilis which involve bone or periosteum in the early part of the course of the disease are accompanied by relatively more prominent objective phenomena than those late lesions which are now under consideration; yet, at the same time, they are rarely followed by caries or necrosis. These processes, it seems, are reserved for the late secondary or sequelar period of the disease. Thus, it will be seen that, although the local process is apparently more severe in the early cases, destruction of the vitality of the bone is not so likely to occur. There is a marked difference between the nodes and diffuse subperiosteal swellings of early syphilis, and the condition of the bone and periosteum which precedes necrosis *en masse*, or, for that matter, caries, in the late stages of the disease. In addition to the disproportion between the degree of destruction of bone and the objective phenomena preceding such destruction, another point worthy of comment is the fact that syphilis possesses the power of dissecting out definite portions of osseous tissue, apparently by cutting off their nutritive supply, in a manner as cleanly as it could be done by the knife. Thus, I have specimens in my possession of the intermaxillary bone, portions of the alveolar process of the maxilla, the malar, and the ossæ nasi, which became necrosed, loosened, and were removed from cases of late syphilis. These fragments of bone present as natural a conformation in many instances as in their healthy condition.

As far as I have been able to observe, there seems to be a special predilection in cases of late syphilis for those parts

supplied by the fifth nerve, indicating that the portion of the sympathetic system which presides over these parts is particularly sensitive to the syphilitic impression.

I have found in some instances the tendency to unilateral destruction of osseous tissue particularly marked. Thus the palatal process of the superior maxilla upon one side, or the superior alveolus on the other, may necrose and give way without the corresponding portion of bone becoming affected. Indeed, it seems that in most instances in which necrosis attacks the bones of the face, it is impossible to check the process until the line of demarcation represented by the anatomical outline of the affected bone has been reached. The peculiar manner in which one-half of a structure may be dissected away by the sequelar lesions of syphilis, is exemplified by a case of syphiloma of the tongue which recently came under my observation, in which the sloughing of the organ was limited to the raphé. This case subsequently went on to malignant transformation. I removed the tongue by the galvano-cautery, the disease recurred, and the patient died of hemorrhage several months later.[1]

I have had several cases recently in which that portion of the superior maxilla corresponding to the intermaxillary bone was dissected out by the syphilitic process with the resultant loss of the incisor teeth, the remainder of the jaw remaining intact. There appears to be a peculiar predilection of late syphilis for this portion of the jaw. I have seen several cases in which caries occurred in this situation with a consequent loss of one or more perfectly healthy teeth. These cases have appeared to me to be so characteristic that I have come to regard loss of the incisor teeth without any apparent cause as almost positive evidence of syphilis.

An interesting case illustrating the unilateral limitation of some late lesions of syphilis came under my observation recently.

[1] Apparent Cancerous Transformation of Syphiloma of the Tongue—Amputation by the Galvano-Cautery. N. Y. Medical Record, Oct. 26, 1889.

The patient was a gentleman who had an obscure history of syphilis, dating some years back. Several weeks before coming under my observation, ulceration began at the roots of the molar teeth upon one side and extended outward to the palate. When I first saw the case the ulceration had extended outward upon the hard palate for about three-quarters of an inch and forward to the median line, when it abruptly stopped. The appearance of the ulceration was quite typical. There was no disease of the teeth or jaws to account for it. Healing was quite rapid under appropriate anti-syphilitic treatment.

Another interesting case of a somewhat similar character:

The patient was a gentleman who had syphilis seven or eight years ago. For the last three or four years he has had occasional symptoms of the disease. A few months since ulceration occurred about the roots of the upper incisor teeth and was attended with slight caries of the intermaxillary bone. The process was checked by appropriate treatment, the teeth, which were loosened, finally becoming perfectly solid. About six or eight weeks after the ulceration was healed the patient consulted me for supra- and infra-orbital neuralgia and hemicrania. This resisted all treatment except anti-syphilitic remedies. It yielded readily to iodide of potassium in large doses. Within a few days the patient has again consulted me for paræsthesia of the right side of the face, which he noticed for the first time while being shaved. His face having been excessively tender previously, he very speedily noticed a lack of sensibility under the razor. Associated with this paræsthesia there is obscure pain, which he locates back of the eyeball. The *ensemble* of symptoms in this case points to central disturbance and evidence a manifest predilection of the sequelar lesion for the fifth cranial nerve.

The association of obstinate tubercular syphilides with nervous syphilis is well known. It seems that the danger of involvement of the central nervous system is directly proportionate to that of severe syphilides.

In considering the tropho-neurotic character of the late lesions of syphilis, I do not ignore the fact that syphilis may act directly upon the nervous system in several different ways:

1. By the direct effect of syphilitic deposit upon the nerve cells or fibres, or membranes of the brain and spinal cord.

2. By changes in the membranous envelopes of the brain and spinal cord.

3. By deposits in and about the bloodvessels which induce circulatory disturbance.

4. By a proliferation and condensation of connective tissue which remains after the syphilitic material *per se* has been removed.

There is probably a difference in the late and early forms of syphilitic lesions in the manner in which the trophoneurotic element is brought about. Thus it may be due, in the *first* place, to a direct impression of the syphilitic poison upon the sympathetic nervous system. *Secondly*, upon direct pressure upon the nervous structures. *Thirdly*, upon a disturbance of function and nutrition of the nervous structures incidental to interference with blood supply.

It is probable that mercury acts upon the nervous system in very much the same manner as does syphilis. It is very difficult to differentiate late syphilitic lesions of the bones and of the mucous membranes from those directly due to the action of mercury. That mercury exerts a powerful effect upon the sympathetic nervous system is, it seems to me, shown conclusively by the phenomena of ptyalism, which cannot be accounted for solely upon the theory of the production of irritation. The well-known power of mercury over the secretions is probably due to its influence upon the sympathetic ganglia. When the injurious action of mercury is superadded to syphilis, there is a more marked tendency to tropho neurotic phenomena than in well-treated cases of the disease. Indeed, the excessive use of mercury often seems to determine the predilection of late syphilis for the bones of the head and face. It is quite as capable of producing necrosis or destructive ulceration of these parts, as is syphilis *per se.*

Positive demonstration of the dependence of the phenomena which I have outlined, upon nervous disturbance, is, of course, difficult, but the inferences which I have drawn appear to me

to be logical. In considering the question of trophic disturbances in their relation to destructive syphilitic processes it is well to remember the familiar physiological experiment of section of the sympathetic in the neck of the rabbit. The same experiment is also interesting as bearing upon the faucial congestion of early syphilis. The reddening of the ear of the rabbit, the inflammation and sloughing of the cornea, incidental to section of the sympathetic are certainly suggestive. To carry the analogy of this physiological demonstration a little further, I would call attention to the serious corneal trouble which sometimes results from herpes frontalis *seu* orbicularis.

GUNSHOT FRACTURES OF THE FEMUR.

By John Brownrigg, M.D.,
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It would be out of place to review the authorities, or even the treatment of this fracture by leading surgeons, in this paper. During our civil war the average shortening was $2\frac{31}{100}$ inches; from a fourth of an inch to eight inches. Certainly better results should be obtained, and with appliances which can at all times be made in camps and farm-houses.

I hope to be able to present such a plan, and trust that its simplicity and cheapness will be arguments in its favor.

The statistics show a greater mortality after amputations than after treatment, in our civil war. I will not now discuss the class of cases requiring amputation, and those in which a more conservative course should be pursued; but will propose the use of more effectual treatment.

These appliances have been well made for a dollar and eighty cents, exclusive of the small air-pillow required to elevate the knee slightly, and this pillow will last during the treatment of many cases. With the knee slightly elevated the limb is in an easy position, and yet not so crooked as to lose any advantage, so far as extension and counter-extension are concerned, as compared with the straight position.

Dr. Gordon Buck's extension is sufficient in all cases. I have used with his appliances a thin board about nine inches long, to go between Buck's thin block and the foot, to support the foot and to keep the heel above the bed; also, in-

stead of a roller, a many-tailed bandage with the ends tied together over a strip of leather, in front of the leg, to retain the adhesive plaster securely applied. Coaptation is secured by wooden splints about three-fourths of an inch wide, rounded and smoothed next the skin. These splints should be kept at equal distances from each other by tacking tapes on their outside. Where two splints are near a wound, their edges should be cut out so as to avoid pressure on the wounds, and to allow the wounds to be washed without removing the splints. Strips of cloth should be tied around these splints. They sink into the flesh partly, and act on the bone better than a splint with an unbroken smooth surface. When it is necessary to dress the wounds, the air-pillow should be inflated a little more, the strips of cloth removed from the splints except at their ends, a rubber cloth placed under the thigh, and the wounds bathed without relaxing the pressure of the splints.

When spiculæ of bone cause irritation, it is sometimes necessary to attach to the extending cord a twenty-five pound weight. This necessitates sufficient counter-extension. The want of this has been the principal cause of bad results. The perineal band has been relied on by many surgeons. This presses on a few inches of tender skin, and has been condemned by high authority (Hamilton, *On Fractures and Dislocations*). In the counter-extension appliance described below the pressure is on about five hundred inches of tough skin, and embraces in its grasp the bony framework of the chest.

It is composed of a jacket made of strong cotton cloth, to fit the form, from below the lower margin of the ribs, to near the axillæ. A plait on either side, about three inches long, will make it fit very well. A piece of bootmaker's strap, or some substitute for it, should be sewed along both its edges to the jacket, just above the lower margin, on its outside, so that a buckle on one end of the strap will enable you to buckle the strap tightly around the waist, just below the

margin of the ribs. Tapes are sewed to the edges of the jacket in front, about an inch apart, to lace it. This is better than a cord and eyelet holes, as the patient may loosen them when he wishes to do so, until he gets accustomed to the jacket.

Straps of cotton cloth doubled, or other material, about an inch wide, should be sewed to the upper edge of the jacket, one in front and one behind each shoulder, about half-way from the outside of the shoulder to the neck. They should be fastened at an elevation, and wide enough apart to allow free motion of the head from side to side.

This jacket will afford any amount of counter-extension that may be required. Twenty-five pounds until the muscles become relaxed, then fifteen, and the last two weeks ten pounds will answer in powerful subjects, even when there is muscular spasm.

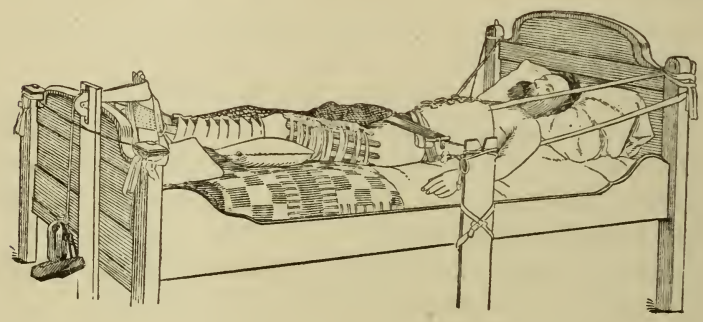
The patient may complain at first, but if it is removed he will ask for it in a few hours. I have used it thirteen times in different cases of fractures of the femur, and in one case of gunshot fracture in which there was considerable comminution, without any shortening.

The effectiveness of this jacket depends upon keeping the band at its lower margin buckled tightly below the margin of the ribs, and if it stretches so as to slip up at first, it is necessary to loosen the jacket and its fastenings to the bed-posts and reapply it.

A patient with a fractured femur always tries to move his hips away from the injured side. This is prevented by a band around the hips, secured to a board at the side of the bed, resting on the floor, and the upper end about a foot higher than the bed, so that the band will be secured to it at an elevation. The extending cord and counter-extending bands being also secured at an elevation, the patient rests lightly on the bed, and bed-sores are prevented.

It is not necessary to have a section mattress, as the patient can support himself on the foot of his well leg and his elbows,

so that a bed-pan can be placed under him, without relaxing the extension or counter-extension, or interfering with co-aptation, or bending the bone at the point of fracture. I was not convinced of this until after frequent careful observations. These appliances can therefore be used with the patient lying on a bed-sack filled with straw, on the ground in a tent, with two stakes driven in the ground near the head of his bed, and two forks at the foot, with a smooth, round stick across the forks for a roller, over which the extending cord is placed. With a piece of cloth, a cord, an ordinary spool, or a round stick in two forks for a roller, a buckle and strap, a piece of moleskin or rubber adhesive plaster, and an air-pillow or a good substitute for it, all these appliances can be made.



Anything except an air-pillow gets hard and interferes with the circulation, and requires constant watchfulness. The opinion has prevailed that when there is much loss of bone with its periosteum, if too much hiatus is left between the ends of the broken bone, it will not unite. I am convinced that this is not the case. I have often observed in cases of that nature, where the wound was open so as to admit of it, that when bone and flesh were growing together, during the restorative process, the bone was always a little in advance of the flesh, and have seen four inches of bone restored in that way, the new bone growing from each broken end until the ends met.

If there is sufficient extension and counter-extension, fragments of bone which are left in the wound do not cause so much irritation.

I have had this jacket made by a common seamstress in the patient's room several times. When the treatment is over you can carry all the appliances in your overcoat pocket, except the boards at the foot and side of the bed, and the extension weight.

After the bone has united securely, it is best to place the limb on a double inclined plane, until the bone is strong enough for the patient to sit up and use crutches. This can be made anywhere with some boards, a few tacks, and a piece of leather.

Four years of service in the field, and in hospitals for the wounded, and the results of treatment then witnessed, have awakened an interest in this subject, which has prompted me ever since to attempt to obtain the great wants, viz.: efficient counter-extension, and such efficient coaptation as will admit of proper attention to the wounds. Of sixteen femurs which united after gunshot fracture of the shaft, which are depicted in the *Medical and Surgical History of the War, etc.*, Part III., Surgical volume, from preparations in the Army Medical Museum, eleven were shortened by overlapping of the broken ends. These silent witnesses admonish us to be prepared before another war.

DISCUSSION.

Dr. I. S. Stone, of Lincoln, Va.—I was very much interested in the paper of Dr. Brownrigg. I have had no experience with gunshot fractures of the femur, but as the question of fracture of the neck of the femur has been mentioned I will briefly cite a case or two. In the treatment of these cases I have only tried Smith's anterior splint, having had altogether about half a dozen cases.

The first case was that of a woman, sixty-eight years of age. I kept her in bed two months with Smith's anterior splint. She made a fairly good recovery, with very little shortening, but died two years after with pneumonia.

The next case I had was a gentleman sixty-five years of age, who was exceedingly active. I placed the limb in a splint and as soon as the inflammatory troubles had subsided sufficiently, I allowed him to assume a partially erect position every day He also made a good recovery, with very little shortening. In a few months he was able to ride horseback.

I call attention to this method because I think too much apparatus is very often disadvantageous for these old patients.

The next case was a lady, between sixty and seventy years of age. I put her to bed without any splint whatever, put a bandage around her hips, put a weight on her leg, and used adhesive strap and pulley. She remained in bed eight weeks, taking a little exercise every day. She made as good recovery as though I had applied the anterior splint. Other cases occurring in practice have been uniformly treated as this last one.

Dr. John D. S. Davis, of Birmingham, Alabama.—Did I understand you to say (meaning Dr. Brownrigg) you had fractures of anatomical neck of the femur treated by this plan?

Dr. Brownrigg.—Yes, sir; three cases.

Dr. Davis (resuming).—I agree with Dr. Stone that the less apparatus the better. But from what I know of the various methods of dressing fractures of the femur I think Dr. Brownrigg's the best, with the exception of the plaster-of-Paris dressing. There is no dressing, in my opinion, that will lead the plaster-of Paris. In it we have a simple dressing, one that you can apply anywhere, and one that you can carry with you. The objection to it is that the limb shrinks and the dressing becomes loose after its application. On the second day I cut the plaster on the injured leg clear up, then tighten it as required. The plaster-of-Paris extends from the toes up and around the injured leg, around the pelvis to the crest of the ilium and around the uninjured leg to the knee. It is the best dressing I have seen applied for fractures of the femur.

The case I saw in 1884 of gunshot fracture of the anatomical neck of the femur was in a young lady (it was an accident). I placed her on the edge of a bed and piled some books under the pelvis and drew her limbs out, after the method of Westmoreland, Jr., and then applied a plaster-of-Paris bandage on the injured limb from the foot to the crest of the ilium and from the

crest of the ilium down to the knee of the uninjured limb. There was no observable shortening in the case. I mention this for the reason that we are sometimes unexpectedly called out in the country, and if we all attempt to make the apparatus of Dr. Brownrigg we will fail. It is an excellent dressing, however, when prepared and applied by one experienced with it.

Dr. Brownrigg.—My success has been such that I never use any other plan of treatment than that which I have outlined. I think it is a mistake to say that fractures of the neck of the femur do not require extension and counter-extension. How can you retain the bones in apposition in any other way? Almost all of the muscles attached to the trochanter will necessarily separate the bones. If it is an impacted fracture of the neck you have no assurance or security that it will remain in position unless you apply a proper dressing. In one case of fracture of the neck of the femur I used the same plan. It was in a man who had sustained a railroad injury. His injuries were very severe. The question of fracture of the neck of the femur is a difficult one; surgeons have differed widely about it. I believe that the common consent of the profession now is that there must be some extension to prevent separation of the fragments. I have no statistics upon which to base this opinion; I have only treated three cases. I have treated other cases in which I followed the old plan, with considerable shortening. In neither of the three cases by my own plan was there one particle of shortening. In the case of the woman, walking is fairly good; she has no shortening, or if she had any shortening I am unable to detect it by Bryant's test. I believe this plan of treatment will remove from the treatment of fractures of the neck of the femur many of the difficulties that have surrounded it.

So far as gunshot fractures in military practice are concerned, I believe if it can be introduced in our practice it will be a boon to soldiers. We know how they die when their limbs are amputated. Many of them die because they do not receive proper extension and counter-extension. We have only to refer to army statistics in this matter.

Dr. G. Frank Lydston, of Chicago.—I have been greatly interested in the paper of Dr. Brownrigg, and I have no doubt that his method of treatment for gunshot and other fractures of the femur is an excellent one. Unfortunately, however, like

most of the complicated methods of treatment, it requires a great deal of experience and observation to enable others to apply the method with equally as good results. I have had but little experience in gunshot fractures—at least since I left the New York hospitals. I have seen a great many ordinary cases of fracture of the femur, and there are some points to which I desire to call attention, some of which are perhaps original, while others are not so. In the first place, with regard to the matter of movement. It seems to me that the surgeon, as a rule, is unnecessarily alarmed regarding the possibility of motion between the fractured ends of bone; particularly is this so when the patient is sitting up in bed or attending to his various physiological functions. As a matter of fact there are many simple forms of dressing which, when applied to fractures of the thigh, will prevent movement between the fractured ends of bones, when the thigh is flexed on the pelvis, or when the trunk of the patient is flexed on the thigh as the patient assumes an erect posture. Some apparatus should be applied to facilitate up-and-down movement of the limb. The ordinary weight and pulley does not accomplish this effectually, because there is more or less obstruction on account of the calf of the leg sinking into the bed. I use a modification of an apparatus that I first saw in the Chambers Street Hospital, New York, used, I think, by Dr. William T. Bull. This is a sort of tramway. The calf of the leg is strapped upon this platform or back splint like this (illustrating). The platform rests upon two transverse cross-pieces notched near their ends in this way. These notches correspond to the pyramidal surfaces of two longitudinal cleats upon which the whole thing rests. The leg is strapped upon this back splint (illustrating) and the latter placed upon the tramway in such a manner that the notches correspond with the pyramidal surfaces of the longitudinal pieces you see here; then the weight and pulley are applied and the thigh properly supported by side splints so that the patient can slide up and down.

I am now using a modification of this tramway in which rollers are adapted to the apparatus. These rollers are patterned after those used in the sliding seats of racing shells.

Dr. R. M. Cunningham, of Pratt Mines, Alabama.—I rise to confirm what has been said by Dr. Davis and others in regard to the adaptability and perfection of the plaster-of-Paris dressing.

I want to say also that, as a general thing, according to certain statistics I have been making in the last six years, the treatment of fractures of the thigh has not been satisfactory throughout the country generally. I have had occasion to examine in the neighborhood of three thousand men (convicts sent to the Alabama penitentiary) within this period, mostly from the poor, laboring population, and nine-tenths of them are negroes, and a considerable number of them have had fractures of the thigh before conviction. I find in those who have sustained a fracture of the thigh, shortening from one-fourth to four inches is the rule in the vast majority of cases. Dr. Hamilton says in all cases of fracture of the thigh there is some shortening. By no dressing have I been able in any instance to get a broken femur as long as the other. Two things are necessary in the treatment of fractures—as I was taught by Dr. Yandell, in 1874—first, put the bones together; and second, keep them there. In keeping them there he taught us to make the joints above and below absolutely immovable. For that reason, in fractures of the thigh I have always used a spica bandage. I think it answers the purpose. I indorse what has been said in regard to putting the limb up in plaster at once. What is it that causes swelling in fractures? It is the irritation of the soft parts by the fragments of bone. If you replace these bones, which, by the way, should be done under anæsthesia, and maintain them there, there is going to be but little swelling, unless it be indirect fracture where the violence causing the fracture may cause considerable swelling.

Dr. Brownrigg.—I am sorry I have not statistics with regard to the plaster-of-Paris bandage. One of the worst cases I ever had was treated with a plaster-of-Paris bandage and was ununited after ten weeks. I am familiar with Dr. Westmoreland's description of his bandage, and also with that of Dr. Louis A. Sayre. This is the Hamilton Sayre controversy revived. How can we secure the necessary facilities for dressing the wound? It is very difficult. I have tried it in compound fractures below the knee. The dressing becomes soiled and offensive. There is no limb that will preserve the same contour during the long-continued treatment of these fractures. The extension which is afforded by the plaster bandage presses upon the instep and heel necessarily. If you have sufficient extension and contra-extension to overcome the trouble, and there is spasmodic contraction of the

muscles of a powerful man, it is utterly impossible for him to stand the pressure. We are necessarily compelled to fall back on this plan of treatment or those which we used during the war —Smith's extension, John T. Hodgen's, and Dr. Hamilton's. Hamilton admits that when a patient is delirious, which is often the case, his counter-extension will not do. It is absolutely necessary to make the will of the patient a part of the treatment in Hamilton's plan of treating fracture of the femur. Where I cannot use my own apparatus I use his, depending upon the assistance of nurses to supply the deficiency on the part of the will of the patient. With children, Hamilton admits that he cannot treat them on his plan. He had to fall back on Gibson's plan of sixty years ago, the child being tied down with a heavy weight to the bed. I protest against any plan which binds the patient down to the bed with wood or iron.

So far as my observation of counter-extension goes I am positively certain, and I can demonstrate it to you, that if you apply this jacket with fifty pounds extension weight, a man can stand it without difficulty. I have never found a case that required more than twenty-five pounds.

If I use plaster-of-Paris bandage in any case of fracture, I adopt the plan of Dr. Wackerhagen, of Brooklyn. How many physicians throughout this broad land have a pair of plaster-of-Paris shears? It is useless to apply a dressing which must be cut open at once, when Wackerhagen's plan obviates the necessity of cutting. No plan of treating fractures is safe which does not admit of constant exposure and examination of the limb.

THE TREATMENT OF CHRONIC CYSTITIS IN WOMEN.

By Hunter McGuire, M.D.,
Richmond, Va.

The successful treatment of chronic cystitis in women requires an unusual amount of patience, skill, and tact on the part of the surgeon.

In the first place, functional bladder trouble has to be eliminated from true cystitis. Pain about the pubic region and pelvis generally, frequent and painful micturition, tenesmus, the sensation that the bladder is never emptied, going on day and night for weeks, producing emaciation, exhaustion, and a life of wretchedness, may be due to a great variety of causes. It may be purely functional; piles, fissure of the anus, and ulcer of the rectum, or thread-worms in this organ, may cause reflex bladder symptoms. Malaria may provoke vesical irritability; sometimes this happens without serious disturbance of the organs of digestion and alterations in the character of the urine; under such circumstances the only explanation that can be given is the effect of malaria on the nervous system.

We cannot help believing true vesical irritability is occasionally a pure neurosis; certainly there are cases which can be explained in no other way. As our knowledge of pathology, however, increases, these cases of neuroses of the bladder, as well as of other organs, will become less frequent; improvement in our knowledge of the pathological changes which take place in the female urethra will surely contribute to this end. Masturbation is another source of vesical dis-

orders; congestion of all the pelvic organs and irritation of the meatus urinarius follow its prolonged practice. Diseases of the uterus, especially of the cervix uteri, and displacement of the womb are common sources of functional vesical disorders. Pelvic abscesses and tumors frequently provoke this trouble. One of the most persistent and painful cases of functional vesical trouble that I have ever seen was in a woman, who still menstruated regularly at forty-seven years of age. She had constant but not very severe pain until the monthly period came on, when the pain became very severe, and morphine was freely given to relieve it. I removed, in this case, the left ovary and the tube, finding upon the latter a neuromatous growth about as big as a marble; she went home in a month entirely well.

It is pretty safe to conclude that when the urine is normal, or nearly so, that the disorder is functional, and not true cystitis; again, as a rule—with, of course, exceptions—when a woman has to void her urine frequently, and suffers pain in the act, but is relieved when the viscus is empty; or, if she attempts to hold the water too long, spasm of the bladder comes on and the urine is involuntarily ejected in spurts, then the trouble is functional, but when there is great and prolonged tenesmus, pain, and straining after the water has all come away, as a rule there is real disease of the bladder or urethra.

The only way to treat functional bladder trouble is, of course, to correct, if possible, the cause. A displaced womb must be replaced and retained in its proper position; a diseased womb must be cured, rectal trouble relieved, a foreign body in the bladder removed, etc. It is of the treatment of true cystitis, chronic in character, uncomplicated by other disorders, that I wish to speak.

Generally in chronic cystitis the urine is loaded with phosphates and muco-purulent matter; it is also more or less alkaline. Before any operative interference is undertaken, the urine should be made normally acid; this can generally be accomplished by the free use of citric acid in the shape of

lemonade, or lemon juice and water; the mineral acids act more slowly, and benzoic acid is not often well borne by the stomach if administered for too long a period of time. I have seen the use of citric acid in one day remove a thick phosphatic crust on the edges of a vesico-vaginal fistula, or on the wound through the perineum in lateral lithotomy.

The first step in the surgical procedure is to dilate the urethra, far enough to paralyze temporarily the sphincter muscle. This should be done while the patient is under the influence of an anæsthetic. I use for dilatation a three-bladed urethral speculum, and after the expansion has been continued far enough the speculum is removed and the finger introduced into the bladder. The dilatation should be done slowly, twenty or thirty minutes being required before the process is complete; after this a short piece of drainage-tube is introduced into the bladder, and the urine allowed to drip into a cup between the legs of the patient, if she lies on her back, or close to the hip if she is lying on her side. The latter is preferable, as in that position the tube is more easily retained. The tube should be introduced into the bladder only far enough to drain the organ, and the free end should be just long enough to drip the water into the cup. If too long, it will be pulled out of the bladder by its own weight. The object of the treatment is to give the bladder complete rest. The tube should be kept clean by occasionally washing or changing it. It is a good plan to wash the bladder out through the tube once or twice a day with hot water. I published an account of the treatment of obstinate chronic cystitis by drainage in 1874. Since that time I have repeatedly resorted to it, and with great success. For the last three or four years I have added dilatation of the urethra to the drainage, in this way making physiological rest of the organ more complete. If the paralysis of the canal and sphincter passes off before the cure is effected, dilatation must be repeated.

THE TREATMENT OF CONTRACTED BLADDER BY HOT-WATER DILATATION.

By I. S. Stone, M.D.,
Lincoln, Va.

During the past few years certain protracted cases of cystitis, occurring chiefly in women, have been observed by the writer, which have resisted all known forms of medical treatment, and necessitated some surgical or mechanical measure of relief.

The chief difficulty in the way of successful treatment heretofore would appear to be due to a want of comprehension of the result of long-continued disease of this viscus. Another difficulty presents itself, in that surgeons have not learned to ascertain carefully the exact size—*i. e.*, the capacity of the bladder. For instance, we are directed in the text-books to use a sound carefully to measure the depth of the bladder. If fifteen centimetres (six inches) (Baker), it is supposed not to be smaller than normal. Such an examination may lead to error, as a bladder may be fifteen centimetres in depth, and yet contain very little fluid. I have seen several cases in which the sound would enter but two to three inches, and yet by proper measurement with water they would hold more than this depth would indicate. We usually resort to various expedients to learn definitely the shape, size, capacity, etc., of other organs; would it not be well to apply the same methods to the organ in question—the bladder? The sound is valuable as an aid to diagnosis; the endoscope, with proper illumination, has almost revolutionized the treatment of intra-vesical diseases, but it remains for surgeons

generally to measure carefully the capacity of the bladder in any case of long-continued disease thereof.

Kussmaul, in 1869, called attention to the treatment of certain diseases of the stomach by lavage. This involved accurate measurement, although no mention is made of it, save to show when overdistended. Freich distended the stomach with gas, but only to outline the organ. I respectfully urge the employment of hot water, plain or medicated with boric acid, to ascertain the size of diseased bladders, and to dilate them if found less than the normal size. The patient rarely gives a correct statement as to the quantity of urine each day, or at each act of micturition. Such statements are about as reliable as their representations as to color, appearance, sediment, etc., therefore it would appear unnecessary to urge at great length the importance of the above remark.

Let me ask that it be taken for granted, that the pathology of cystitis is well understood, so far as its effect upon the three principal divisions of tissue in the bladder is concerned. That the muscular coat when continued in extreme contraction (excentric or concentric) becomes permanently fixed in this state, simulating at first a tonic spasm.

That any fluid, healthy urine not excepted, but especially urine of high specific gravity, or loaded with pus, or swarming with bacteria, and strong with ammonia, must arouse the various coats of the inflamed bladder to exert themselves in an agony of contraction, which in weeks, or in months, becomes permanently fixed.

Causation.—My opinion is decidedly favorable to the idea that cystitis is always secondary to other disease, beyond or outside the bladder. Exception is made in case of traumatism, or from active poisons.

I reject emphatically the possibility of cystitis from exposure to cold, and very much doubt the possibility of idiopathic cystitis. Later writers generally favor this opinion, notably Thompson, Baker, Harrison, *et al.* Thus, we have causes referable to the kidneys or ureters (the writer has had two cases from tubercular kidney); the various diseases of

the peritoneum adjacent to and covering the bladder, epicystitis, etc.

The exceeding hypertrophy of the walls of the bladder is often quite astonishing, and when the patient is examined per rectum or vaginam the sensation is like that given to the finger by a fibroid of the uterus. It is in vain that we may expect this great thickening to disappear in any case by drainage, internal medication, or irrigation. It is plausible to mention pressure, if pressure could be exercised. I suggest that by means of hot-water distention such a bladder may be treated, dilated, and exercised. It is to this form of treatment, aided by the injection of iodoform, that I now wish to call your attention.

TREATMENT.—The failure of irrigation as a method of treatment in cases of contracted bladder from cystitis or other cause, would now appear to be due in part to the impossibility of thus cleansing such an irregular surface. We know there are many pockets, and perhaps duplications, in such bladders, not to speak of the shaggy coat shown by means of the endoscope; beside many glands, probably with septic contents. Hence, a thorough dilatation would appear imperatively necessary, if a diseased bladder be actually cleansed. I may say, in passing, that Dr. T. A. Emmet does not favor irrigation. Neither does Agnew, who says, in his *Surgery*, vol. ii. p. 530: "The introduction of liquids, plain or medicated, into the bladder, either as washings or by irrigation, is of very doubtful propriety. Convinced of their inutility, and of their bad effects, I have for some time abandoned their use. . . ."

I will not allude in this paper to dilatation of the urethra or to drainage by catheter. The former applies only to the urethra or its vicinity; the latter cannot cure a contracted bladder.

According to Dr. Weir, of New York, in 36 cases requiring cystotomy, 11 died; 17 were cured, or nearly so; 4 were slightly relieved, and 4 not benefited.

Therefore, the operation of Dr. Emmet[1] would appear not

to be without danger, or, at least, it is far from always proving successful. It needs but to be tried to know how exceedingly distressing the condition of the patient becomes from the flow of urine through the vagina.

Skene has invented an instrument, however, which may possibly overcome this difficulty in some cases. Moreover, Emmet's operation of cystotomy is worthy of a position unattained by any other method of treatment, for it may give great relief where nothing else can succeed, even should it fail in curing the contraction.

In the treatment of contracted bladder by dilatation, it must be taken for granted that the case is a suitable one to receive the proper distention. It would, of course, be bad surgery to commence dilating an organ already attacked by malignant disease, or so far weakened by any pathological condition, as to render such a procedure hazardous. We will take it for granted that the organ is contracted as a result of long-continued irritability, or from cystitis from any cause, either as a result of pyelitis or other disease of the kidney, or from other causes in the pelvic cavity, outside the bladder, such as pericystitis, or, finally, from infection, as by foul catheters.

The patient is given morphine sul. gr. $\frac{1}{4}$, atropine sul. gr. $\frac{1}{200}$, hypodermically. She is placed on her back on a table for convenience, although it would answer to arrange the bed with the patient thereon to suit the operation. A soft catheter is at once inserted into the bladder, and often the urine has escaped; hot water, temp. 110°, is thrown into the bladder, until the patient will no longer bear it. This is allowed to escape, and is measured, giving the full size of the bladder in its present condition. As the morphine gradually becomes absorbed, the patient will bear still further distention; each time perhaps one drachm may be added to the capacity of the bladder. I prefer using a rubber-ball syringe, holding two to four ounces. The pressure of the hand is safer

[1] Dr. Emmet reports, in his Gynecology, ten out of sixteen cases cured by cystotomy.

than that of the tube and funnel, or any instrumental gauge; as the patient is generally unable to resist the tendency to strain, owing to the tenesmus produced by the expansion of the bladder. As each *séance* should continue thirty to sixty minutes, the bladder may be filled and emptied many times, and at first the operator must be well satisfied if the gain is only one or two drachms, in a bladder whose capacity is, perhaps, only two ounces. As the patient becomes fully under the influence of the morphine, the water may be increased in temperature to 120° or 125° F. The very best effect follows its use when at this temperature.

In concluding the *séance*, if the case has never had a trial of nitrate of silver, and there is surely ulceration present, the drug may be tried, gr. x to xx or xxx ad ʒj aqua dest. Enough of the solution should be thrown in to distend the bladder at least to one-half its capacity, but never to the full extent, as the drug is not intended for the freshly separated portions, but only for the ulcerated surface. I do not personally approve of silver nitrate, either in the uterus or bladder, under any circumstances, but mention the above on the authority of others. I am fully convinced that if used without the hot-water method of treatment here proposed, still greater contraction must result, especially if the stronger solutions are tried, as by some recommended. I very much prefer iodoform, made with gum acaciæ into a mucilaginous mixture; ten grains may thus be thrown into the bladder in appropriate quantity of liquid, so that the patient will allow it to remain for some hours, if possible. The bladder will thus be coated with iodoform for several days before the urine can dislodge it. I have never seen any evidence of its absorption into the circulation, or witnessed any but good results from this method of using it. Cocaine has not answered well, even in ten per cent. solution, to relieve pain inside the bladder. It will not prevent pain or allay it, in this treatment, or that following the nitrate of silver.

It has always proven a failure, except for some slight operation on the urethra, where it appears to act well. My prac-

tice has been to follow up the distention with hot water—with the patient under the influence of morphine—by daily distention without the anodyne. An effort should be made to keep the bladder open to the point already reached, until the period of five days has passed, when the patient will be ready for the morphine and still further distention. It will be found that on the first and second days after the morphine and full distention, the patient will not be willing to take the full amount of water, even after several trials, occupying the space of an hour, but after this the full quantity will be allowed. It will be ascertained on trial that water at a temperature of 110° to 125° F. will give far better results than at a lower degree. One word in regard to the possibility of hemorrhage. I have rarely succeeded in accomplishing much in these cases, without causing a slight hemorrhage. It at first caused me some anxiety, and I remember writing to Dr. Gross about it. He advised me never to carry the dilatation to that extent. Experience with the method, however, served to show that a slight hemorrhage did no harm, and in fact I have never seen any bad results. The oozing always ceased promptly when the bladder was allowed to contract. I have frequently seen one or two drachms (estimated) at one *séance*, the water returning highly colored. I fancy many doubts will arise as to the safety of this method. I have thus far found only one reference to rupture of the bladder caused by dilatation—Skene (*Diseases of Women*, p. 752). The patient had long worn a hard catheter fastened in the bladder, which by pressure had perforated two of the coats of the bladder, leaving only the peritoneal coat to rupture when the effort of dilatation was made. The autopsy clearly demonstrated this as the cause of the accident. As to the amount of distention, authorities differ. Some would suggest not to the full extent, that it is dangerous to exceed eight ounces if the bladder has been reduced to one or two ounces. My experience is, that a bladder will again contract unless it is brought out full and free from internal adhesions, to eighteen or twenty ounces. Even then it requires occasional stretching and care to pre-

vent contraction from recurring. If hemorrhage has frequently occurred when any important gain in size has been made, it will probably cease when the full size, sixteen to twenty ounces, has been reached, and a gain in capacity of one to two ounces may be made at one sitting, showing plainly that the bladder is folded upon itself, as it contracts from disease. This may be easily understood by referring to Skene's valuable diagrams, *Diseases of Women*, pp. 773 and 774.

The following cases are very briefly told for illustration:

Case I.—Male, æt. thirty-eight, had chronic cystitis for three years, which resulted in contracted bladder, without the knowledge of his physician, who had faithfully continued the drugs supposed to influence the bladder. When first seen (December, 1885), there was evidence of pyelitis or abscess of the right kidney. This proved to be an abscess, which was drained through the usual lumbar incision, used in nephrotomy. The patient, although greatly relieved, gradually sank in a few weeks from general tuberculosis. So far as the bladder is concerned an effort was made to dilate it, which failed because of the very reduced condition of the patient. Its capacity was less than an ounce, and at the autopsy appeared as a mere pouch at the termination of the ureters.

Case II.—Miss M., æt. twenty-five, had been treated for cystitis for two or more years, with apparent success at first, but afterward all treatment failed, and when I first saw her in 1886 her bladder would hold less than four ounces full distention. As I suspected renal disease, she, at my request, consulted the late Dr. S. W. Gross, of Philadelphia, who had her in charge for nearly two months. While under this eminent surgeon's care, the bladder was increased in capacity from two drachms to two ounces. She came under my care at once after this, and for a time the irrigation and injections of silver nitrate were continued. But owing to the slow progress of the case, and stimulated by the resolution formed while treating Case I, I tried forced distention with hot water. The surgeons who had previously had charge of the case declined to admit the possibility of renal involvement, which at the autopsy, two years after she came under treatment, was proven.

The urine was heavily laden with pus, and epithelium was greatly diminished, as the bladder was thoroughly dilated to nineteen ounces capacity. This patient almost entirely recovered from the cystitis and contracted bladder, but succumbed to the tubercular disease of her right kidney.[1]

Case III.—Miss ——, æt. thirty-six, had frequent micturition and supposed cystitis for three years before coming under my observation, although she had not become an invalid in appearance. I could not discover much evidence of cystitis, save the frequency of urination and dysuria. She was obliged to rise three or four times each night, and never could retain her urine longer than three hours. At the first examination I discovered an anteflexed uterus and quite naturally thought this the cause of the cystitis, which had in turn caused the contracted bladder, which would not retain over three ounces without acute pain and uncontrollable desire to pass urine. As all previous treatment had failed to relieve this patient, I at once commenced to dilate her bladder, and in three months she could retain her urine for eight hours, and slept all night without rising. She had abundant courage and assisted greatly in the treatment, by retaining her urine as long as possible. After learning that I had to do with what may be called pericystitis, that the uterus was drawn over upon the bladder, and tied there by adhesions, the difficulty was readily solved. This lady has apparently recovered, although I could not learn that she had the symptoms of cystitis primarily. It would appear that contracted bladder may easily result from adhesions from pelvic inflammation, as it may result from direct inoculation, as with an infected catheter.

Case IV.—Male, with large prostate, æt. seventy-five. This patient had tried all forms of treatment, such as by sounds, and by wearing catheters and even the continued use of the galvanic current. His bladder would retain three ounces with forced distention. Could not take morphine. Treatment cured the cystitis, and increased his capacity for urine from three to six ounces. He is greatly relieved and rarely uses a catheter.

Note.—In reference to the priority of this method of treating contracted bladder, I was unaware that other writers

[1] Case II is reported in the Journal of the American Medical Association for November, 1889.

had claimed any degree of success. A careful search of the *Index Catalogue* of the library of the Surgeon-General's Office at Washington gave no evidence of any efficient trial of this method.

During the preparation of this paper the *Amer. Journ. of Obstetrics* for September (p. 961) came with Dr. Sims's interesting paper, read March 5th before the Obstetrical Society of New York. I find, however, that Dr. Sims's paper distinctly refers to contracted bladder in young women who may have incontinence, etc., but he does not claim it as valuable in all forms of contracted bladder, including that from cystitis. A full report of Case II. was prepared in June for a medical journal, but was, owing to accident, not printed. Therefore I confess to being antedated by Dr. Sims, whose first case occurred eight years ago, while mine occurred in 1885, or four years since.

The discussion which followed Dr. Sims's paper shows that in Sweden one Dr. Oscar Nissen, of Christiana, uses this method with great success.

I can heartily commend Dr. Sims's article, and recognize how true his remarks are in reference to the amount of perseverance required on the part of the patient, and I may say on the part of the surgeon as well.

DISCUSSION.

Dr. G. Frank Lydston, of Chicago.—It will be impossible, in the time allotted for the discussions to do justice to these excellent papers. There is one point in Dr. Stone's paper with regard to the danger of dilatation. He mentions Skene as authority for the fact that there is but one fatal case attributed to over-distention in the method of treatment by dilatation. Dr. Stone, Dr. Skene, and other specialists of experience, forget that the men who are to be benefited by their teaching are general practitioners. I do not believe Dr. Skene or Dr. Stone can do much damage with any method of treatment they choose to employ, but the general practitioner might carry dilatation to extremes. We know that there is an anatomical reason for a little danger in the application of the method of dilatation. We

know that the fasciculi or the muscular walls of the bladder are defective at differet points, and that is the reason why we have secondary sacculi form in connection with affections of that viscus. If pressure or dilatation be carried to an extreme degree there is danger of rupture, and it is, therefore, too early to boast of its safety. Wait until the returns come in from the back counties, then we may see a different estimate of the method.

Experience has demonstrated to me that there is an affection of the bladder which is purely neurotic in character. I believe with Dr. McGuire that the neurotic element in vesical diseases is too frequently underrated, particularly in the case of the female. I believe that deficient sexual hygiene, which is responsible for a great many of the genito-urinary difficulties in the male, is also at the bottom of some cases in the female. There is a condition of the bladder in the female which is analogous to that which we term—for want of a better term—neuralgia. This condition we find in women as a result of many causes and curable by dilatation. I keep in my office a set of hard rubber dilators for this class of cases. Very many women who have no organic disease of the urinary apparatus, are affected with frequency of micturition. They complain of nervous excitement, and so on. These cases depend upon hyperæsthesia of the vesical neck corresponding to a condition in the male termed by Van Buren and Keyes "neuralgia of the vesical neck."

There is one point in regard to local medication to which I desire to refer. Dr. Stone spoke of iodoform—which is excellent —but I do not like it very well. I have substituted an application that is antiseptic in character which I think is much better; I call it my "compound iodine and carbolic acid mixture." It is a modification of a formula of Morell McKenzie, which he uses for applications to the nose and throat. It is composed of carbolic acid, iodine, and a few grains of menthol, in combination with boro-glyceride and tannate of glycerine. I have used it in several cases of contracted bladder with excellent results. Electrolysis is the latest fad over which some have gone crazy for stimulating nutrition in the diseased walls of the organ and thus promoting absorption of inflammatory material.

An important point in connection with the troubles of the bladder is, that we are apt to overlook the fact that the kidneys may be at fault. We all know that the urine in pronounced cases of disease of the pelvis of the kidney will produce severe

irritation of the bladder, frequency of micturition, etc., and bring about secondary inflammatory changes. There will be found an irritating condition of the kidneys incidental not to gravel, but which is characteristic of lithæmia. Treatment in such cases should be directed first to improving the state of the blood, and second, to improving the condition of the kidneys.

Dr. John D. S. Davis, of Birmingham, Ala.—I desire to indorse what Dr. McGuire has said as to physiological rest. There is nothing so important and so effective as a curative agent or measure in all bladder troubles, no matter what the pathological condition may be, as physiological rest, together with perfect drainage. I have had more experience with the male than with the female, and in getting rest in the male I always find that an epicystotomy had to be performed for the formation of an epicystic fistula. This fistula will soon contract by cicatricial hardening of the cutaneous surfaces, and close before the pathological conditions in the bladder subside. I have, therefore, devised a tube known as the *epicystic surgical fistula stem* (see illustration).

It does not enter the viscus. It is made an inch and a half long for the purpose of retention only. The bladder may be washed out daily, or as often as you please, and the patient has the advantage of holding his urine in any position and passing it at will.

One of my patients was an old man where the bladder was much distended, and I never used an anæsthetic in his case. I did the operation by a direct plunge of the trocar, withdrew the stylet, introducing the catheter in through the canula, then withdrawing it from around the catheter.

In prostatic hypertrophy or urethral incompetency, where there is much distention of the bladder, due to retention of urine, and the bladder is prominent above the pubis, a sufficient opening can be made by a single plunge of a large trocar or knife for the cystoscopic exploration and the formation of the fistula for intravesical treatment and drainage. If nothing more than drainage

is necessary, the dread and shock of a technical epicystotomy (by a long incision) may be avoided by giving the patient the benefit of a fistula in the manner suggested. My brother, the Secretary, was treating a case with me where I had made the coffee spout fistula of Dr. Hunter McGuire, which gave rise to repeated abscesses, until at his (Dr. W. E. B. Davis) suggestion I made the fistula direct. I was captivated by the result and was so thoroughly convinced that it possessed so many advantages over the indirect or coffee-spout fistula that I have resorted to it exclusively since.

I have three methods for making the incision, viz.:

1. When the distention is great and no intra-vesical operation necessary the opening is made with a trocar, withdrawing the stylet and replacing it with a rubber catheter, after the introduction of which the canula is withdrawn, leaving the catheter in the bladder. It is necessary, sometimes, to enlarge the external or cutaneous opening to prevent a closure of the catheter by compression, and to render the external opening sufficiently large. My brother did this operation in North Alabama a few days before he left home, on a man aged seventy-eight years, who was almost dead, and could not take an anæsthetic, with immediate relief to the patient.

2. The bladder may be opened, when distended, by a direct incision with the knife, in the median line, with cutting edge toward the symphysis pubis at an angle of forty-five degrees. The knife is withdrawn and a catheter is introduced through the wound into the bladder.

3. A perpendicular incision, one or two inches, is made in the median line above the symphysis pubis. If the pyramidalis muscles are in the way the fibres should be cut. The transversalis fascia is divided on a grooved director from symphysis to upper margin of superficial wound. Instead of following Guyon's manœuvre I catch the bladder with a tenaculum on a line with the symphysis, through the prevesical fat, and cut through with a bladder knife into the bladder with one smooth, clean incision, to prevent undue disturbance of the cellulo-adipose tissue between the bladder and pubes, and avoid infiltration. I have never seen a case where it was necessary to put up the prevesical fat, and with it the peritoneal cul-de-sac. If the bladder is caught on a line with the symphysis and cut downward, no fears need be had

for the peritoneum. Cutting this prevesical fat prevents its after dropping down over the opening into the bladder, and acting as a valve to prevent easy access to bladder, escape of urine, and causing infiltration.

In these operations a colpeurynter is not always necessary. Indeed, I operate as often without it, in the rectum, as with it. Especially do I not use it in old men where there is much distention from retention of urine, due to paresis, hypertrophy of prostate or urethral incompetency, and I make the fistula (without the use of an anæsthetic) by one plunge with a large trocar, or with a knife, the shock never being noticeable.

It is my opinion that the fistula possesses the ability, through the recti muscles, and a possible pseudo-sphincter to control the urine at all times and in any position. The pseudo-sphincter muscle is formed, no doubt, by the fibres of the detrusor urinæ. In every case where the fistula is well formed the patient possesses the ability to throw the epicystic surgical stem out without the aid of the outflowing urine. They can, and do, do it when the bladder is empty, as many can testify who have seen my patients on exhibition before our State Association and local county society.

As to dilatation, Dr. Stone, I believe, said nothing about the pressure he used. There is great danger in dilating a bladder. If you are not careful you will have multiple rents on the inside of the viscus, which will produce a fatal hemorrhage.

My method is to use a fountain syringe. I do not hang it high —about three feet above the patient is high enough. I never use an anæsthetic or morphine. In cases where the patient suffers under the pressure of water dilatation you are liable to damage the viscus. Pain is the voice of the trouble. You want it to speak to you. It is the indication for you to be governed by, and without it you might carry dilatation too far.

Dr. George J. Engelmann, of St. Louis.—I like the very clear way in which this important subject has been presented, and I really have nothing new to add. We have all seen the admirable effects following the use of warm water injections. I heartily indorse the practice and only regret that it is not more frequently resorted to; but, if pressure distention of the bladder is to be obtained very great care is necessary.

Whilst various forms of vesical disease are under consideration,

I wish to call the attention of the Association to a class of neurotic disturbances—secondary troubles which resemble cystitis so strongly that I have seen the bladder examined for stone. These cases of severe pain in the bladder, with all the evidences of chronic disease, appear as the sequence of disease of the ureters, or disease of kidney and ureter. I can describe the condition best by giving the history of a patient who came under my observation some months ago, in whom I was sure that no actual disease of the bladder existed; she was suffering from some uterine trouble; pelvic disease followed, then ureteritis and nephritis. The urine at times was perfectly clear and healthy in appearance, at others it presented evidence of renal disease, but it was never alkaline with evidences of cystitis. The patient went abroad, visited the springs, and consulted prominent medical authorities. She was put under the influence of an anæsthetic by one of the best surgeons who saw her, and he examined the bladder for stone. She had all the symptoms of vesical calculus, but I well knew that they were due to a neurosis. I had seen the case develop and felt so confident by reason of the periods of perfect quiet that no vesical disease could exist, so that I had never examined her, although I was tempted to do so, merely to exclude vesical disease with positive certainty.

These cases are more frequently met with than is generally supposed, and many of the vesical symptoms result from disease of the ureters, etc. If you will observe them carefully they are not prominent; the trouble shows itself mainly in frequency of micturition at night; the patient wakes up, is restless, and passes water with a good deal of pain, but is then relieved for a time. At times the urine is loaded with phosphates, but never alkaline. It will show evidences of disease of the kidney, but not of the bladder, and the symptoms are frequently so trying and so much like those of vesical disease that it is well to guard against the very possible error of diagnosis, especially as the question of disease of the ureter is one that has been very little studied and is almost ignored by the profession.

Dr A. V. L. Brokaw, of St. Louis.—I have listened to the papers with a good deal of interest. They deal with subjects which I have for some time made more or less a study. I have seen the best effects from gradual dilatation in cases of cystitis by the method proposed by Dr. McGuire, and I wish he had

laid more stress upon the one fact that the dilatation must be made very gradually, occupying, as he said, twenty or thirty minutes, or even longer, if necessary. As a rule it requires an anæsthetic. I have tried gradual dilatation by the use of cocaine and failed, the local anæsthesia not being complete.

In regard to the use of cocaine in the bladder I have had most excellent effects. Its use is not limited to the urethra.

With reference to the statement as to illuminating the bladder by the cystoscope, and its value in examining the bladder, I would say I was one of the first to use it in this country, and I have not found it very satisfactory in all cases. If there is any exploration of the bladder to be made, an epicystotomy or perineal section, will be found to accomplish nearly as much as the electric light. If you have severe hemorrhage, pus or mucus, the light is obscured. In order to get a good clear view of the bladder with the cystoscope it would be necessary, in certain cases, to have a constant stream of water passing through the bladder. The instrument has failed to give accuracy in several cases with me, where it was supposed there were tumors or stone present. I think we can generally do without it.

Dr. B. E. Hadra, of Galveston, Texas.—The last remark made by Dr. Brokaw seems to me very opportune, especially in regard to that part of the viscus which cannot well be examined by the cystoscope. Unfortunately, it is the place where most of the tumors are met. Therefore, in many cases we will have to do cystotomy for diagnostic and operative purposes.

I would like to draw attention to an operation which Sänger, of Leipsic, has named perineotomy, consisting in an incision through the perineum with the view to get into the peritoneum, or at the different pelvic organs. It seems, in the male, to be a convenient way to reach the base of the bladder, the ureters, prostatic gland, etc. Under certain circumstances it may offer a better approach than pubic cystotomy and, perhaps, also permanent drainage through a perineal opening may turn out less anoying than through an abdominal one.

Dr. W. E. B. Davis, of Birmingham, Ala.—My experience is that in those cases where we dilate the bladder with hot water, if we stop when the patient complains of pain, we do very little dilating.

Dr. McGuire.—I will answer Dr. Roberts's question first, for fear that I may forget it. He asked whether I had ever met with any cases of incontinence of urine from dilatation of the urethra. No; I have never seen permanent incontinence following dilatation. I would be afraid to take out a stone through the urethra an inch in diameter. I have never done that. I have never dilated the female urethra to that extent. You can make an incision through the vesico-vaginal septum and take a stone out without interfering with the urethra, and I prefer to do it in that way. This operation for stone in women is safe and simple. I am no more afraid to dilate the female urethra than to dilate the sphincter ani. I can understand, however, that dilatation may be carried beyond its proper limit and result in incontinence.

Before closing the discussion on his paper, Dr. McGuire, at the request of the Society, gave, in detail, the technique of his operation for the formation of an artificial urethra in enlarged prostate in the male.

After washing the bladder out, shaving and cleansing the parts about the pubes, the rectal bag is introduced and filled with ten or twelve ounces of water. In an emergency, a pig's bladder might be substituted for this bag—one to hold twelve ounces would be the proper size. If he could get nothing else, he would distend the rectum with sponges. This distention of the rectum is important; it pushes the bladder up out of the pelvis into the abdomen; it keeps the peritoneum out of the way; it pushes the bladder close to the anterior abdominal wall, and makes the operation very simple and safe. The patient's bladder is then filled with warm water, containing a small quantity of carbolic acid. It is not necessary or desirable to distend the bladder; indeed, if the distention is carried too far the bladder might burst.

After all is ready he cuts for an inch and a half, just above the symphysis pubis, through the skin, fascia, and fat. He takes great care to keep in the middle line, and makes his cut down to the symphysis; with the handle of the knife he separates the recti muscles, then cuts through the fascia transversalis; again with the handle he goes through some fat and loose cellular tissue, between the fascia and the bladder. Carefully keep in the middle line, and disturb this structure as little as possible. The bladder is then in view; open it with the point of the knife and,

as the water flows out, introduce your finger and examine it; no stitches are necessary anywhere. When the rectal bag is removed, the bladder falls down into the pelvis, and when the parts have healed, and the opening into the bladder is reduced to about the size of the ordinary urethra, this new tube will bear the relation to the bladder that the spout of a coffee-pot does to the pot.

Then the man will be able to retain and expel his water. He can hold his water until it accumulates in the bladder, to a point above the level of the top of the new urethra—for the recti muscles keep the canal closed when not in use, and prevent leaking, no matter what the position of his body. When he makes water it comes out as from the natural urethra, the last of it in jets.

There is no need for drainage tubes after the operation. Drainage is just as complete after this operation as it is after perineal section. It is difficult to believe this, but it will be seen after a trial, or after a careful study of the mechanism of micturition. It was after such a study that he devised the operation. He had in his hospital, when he left, an interesting case of a woman who, in consequence of sloughing after child-birth, had lost the whole of her urethra, and a part of the neck of her bladder. The plan usually practiced in such cases was to close the labia and turn the urine into the rectum. He intended to make, in this case, an artificial urethra above the pubes, as he had done in the male, and close up the lower end of the bladder entirely. He was certain, in this case, that he would succeed in making the woman hold and expel the urine at will.

Dr. Stone.—I have taken pains to consult the literature at the Surgeon-General's Office at Washington, and found a catalogue there which contains thousands of references, yet I was unable to find a reported case of rupture of the bladder from anything like this form of treatment.

I think it is unjust and dishonest if these men have had experience in this matter and do not give us the benefit of it. I have found no case of rupture other than that reported by Dr. Skene.

I have not time to allude to more than a few points brought out in the discussion. I wrote my paper in September, and immediately after that I received a copy of the *American Journal of Obstetrics*, with a discussion in it which took place in the New York Obstetrical Society. Dr. Sims reported a case of dilatation

of the bladder, not exactly for cystitis, but incontinence of urine, occurring in a woman. The discussion which followed was interesting, inasmuch as it revealed the fact that several members of the profession in New York have used this method—some of them for years. Now, it happens I thought I had an original method, so far as success goes. One of the cases treated, and which had been treated by one of the most eminent surgeons in America, as well as others of less note, was apparently cured. The patient was cured of cystitis and contracted bladder by dilatation. The attendant disease of the kidney continued and killed the patient.

In another case the patient experienced so much relief that he retained his urine for six hours without trouble. In another case, that of a young woman, who probably had pelvic inflammation (it was one of the few cases caused by anteflexion), the bladder had contracted to a capacity of something like three ounces with painful micturition.

REMARKS ON CERTAIN OBSCURE AND MINOR FORMS OF PELVIC CELLULITIS SIMULATING MALARIAL FEVER.

By Bedford Brown, M.D.,
Alexandria, Va.

I beg permission to submit some remarks on certain obscure and minor forms of pelvic cellulitis, which in general features simulate malarial fever and are not unfrequently mistaken for that affection.

On recurring to my note-books I can find some twelve cases of pelvic cellulitis, some of a grave and others of a minor form, but all so very obscure in their manifestation of the presence of local lesion as to be well calculated to mislead and to cause a mistaken or false diagnosis to be made of malarial fever.

There was nothing in these cases to call attention to the pelvic organs. I have in this class of cases, in a number of instances, seen them run their course from beginning to end without manifesting the first symptom of local disease in the pelvis, so that the general resemblance to malarial fever was very nearly complete. I am also sure from cases which I have seen in the practice of others of mistaken diagnosis, that it is not an unusual occurrence for cases of obscure pelvic cellulitis to run their entire course without ever being recognized as such. There are minor forms, also, of pelvic cellulitis not unfrequently coming under our observation, obscure and thoroughly disguised in their local symptoms, but attended always with fever, generally slight, but always remittent in type.

In the class of cases under consideration, so far as the pelvis is concerned, there is a negative state of things rather than otherwise. There is invariably no pelvic pain. The patient complains of no pain or discomfort in the abdomen or region of the pelvis or pelvic organs, as the bladder, uterus, or rectum. There is no peritoneal pain or tenderness on pressure. There is no deposition of lymph or effusion of serum under the peritoneum above the broad ligaments. In truth, so far as the sensations of the patients are concerned, there is nothing in these cases to direct your attention to the local affection. Yet local disease of a serious character exists and is the true cause of all the trouble. But while in these cases there is a complete absence of all symptoms leading to a diagnosis of local disease, on making a careful examination per vagina and per rectum, you will find an indurated point in some portion of the cellular tissue of the pelvis, either on the right or left side of the uterus or in the cul-de-sac in the form of a circumscribed prominence. It may not be larger than a small walnut, and feels hard and is tender to the touch on pressure, but not usually over-sensitive. In these examples of circumscribed effusion the uterus is generally easily movable. At other times we find the lymphous effusion much more diffuse and extensive, occasionally involving the entire cellular tissue of the pelvis and causing fixation of the uterus, without giving warning of its presence. And, nevertheless, while the points of effusion are tender to the touch through the vagina, the patient has never complained of pain or discomfort in the pelvis. Now I am satisfied that it requires only a very limited inflammation of the pelvic cellular tissue to create and sustain a protracted symptomatic fever. I have seen cases of circumscribed inflammation of this cellular tissue with lymph effusion producing an indurated point not larger than a hen's egg, maintain a symptomatic fever for two months, without ever causing the slightest pain in that region. I have in numerous instances of this kind seen the type of fever assume that of septicæmia accompanied with rigors, fevers, and perspirations, and then terminate

without suppuration. The class of cases which I wish to describe here as the minor forms of cellulitis constitute those cases in which the local lesion is very limited, is devoid of all pain and no tenderness on pressure over the abdomen. The preliminary rigor is very slight and often absent.

The febrile reaction, though obstinate and somewhat protracted, is never high, and is always of the remittent type. The rise of temperature rarely exceeds 101° in the morning and 102° in the evening, and almost invariably terminates in health. I have not unfrequently seen these cases pursue a course of two or three weeks. They rarely ever manifest indications of septicæmia. In this class of cases, where the finger is inserted in the vagina and made slowly and cautiously to sweep around the roof firmly, there will always be found an indurated point, however small, somewhere in the circle, usually at the utero-vaginal junction or under a broad ligament, which may or may not be sensitive to pressure. Now if the index finger is pressed firmly upon this point, while the index finger of the other hand is pressed equally firmly over the brim of the pelvis outside and above the broad ligament, the extent of this cellular inflammation and induration can be very accurately measured and defined. In these protracted cases, without suppuration, there is often a singular and peculiar series of pathological changes which maintain constitutional infection.

Thus, there will be circumscribed engorgement and inflammation, with deposit of lymph, and then effusion of serum around the lymph, accompanied with a remitting form of fever which, it may be, will continue many days. Then there will ensue a decline of the fever, and possibly a subsidence. Just at this stage it will be observed that the lymph deposit and serous effusion are undergoing absorption, and may finally almost entirely disappear. But in two or three days there is a recurrence of chill and fever and constitutional depression, with all the indications of a new infection, and a renewal of the inflammation and lymph deposit.

This train of symptoms may continue for two or three

weeks, and again subside. I have seen this series of changes recur in a single protracted case as many as five or six times before final resolution. Why some cases of uncomplicated cellulitis should be accompanied with pain, and others not, there appears no method of determining. The most prominent general features in these cases are increased temperature and frequency of pulse-rate.

I have rarely seen the temperature in uncomplicated cellulitis exceed 105°, and the pulse-rate 125, except from pyemic infection. In my experience in cases where the peritoneum is not involved, a temperature of 106° or over, and a pulse-rate of 130, denote purulent infection. As previously remarked, in this class of cases of which I speak the fever is essentially remittent in type. The temperature may go up to 104° at night, but decline toward morning to 100° or 101°.

These diurnal variations may continue for weeks, and even for months. In one case under my charge there was remittent fever every day for six months previous to the subsidence of inflammation and absorption of lymph. I have also seen these cases assume many of the general features of so-called typho-malarial fever. There was the quick pulse, dry tongue, some degree of tympanites, dry skin, remitting form of fever, occasional nocturnal delirium, no pain or any complaint of pain in the pelvis, icteric complexion, and general prostration. The patient lies in a listless, languid condition, perfectly indifferent to life and all surrounding circumstances. On the contrary, in the types of less severity or minor forms, the pulse-rate is usually increased out of proportion to the degree of temperature. For instance, the pulse-rate often rises to 120 when the temperature does not go beyond 102°. In these protracted cases, if there is no actual septicæmia existing, there is a steady and progressive blood-depreciation. There is often a train of symptoms developed consisting of chills, fevers, and perspirations resembling pyæmia, when really there is no suppuration. In this condition the general prostration is extreme. There is usually complete anorexia, nausea, and often vomiting, and the complexion assuming a

genuine icteric hue is well calculated to direct our attention to the liver and divert our minds from the true cause of the trouble. It is a matter of infinite importance to distinguish these obscure cases from malarial fever. On a superficial view it would appear a simple matter, but I am satisfied, from my own experience and that of others, that the two diseases have not infrequently been confounded. There is only one certain method of distinguishing cellulitis from malarial or typhoid fever, and that is the presence of inflammation, lymphous deposit, and serous effusion in the pelvic cellular tissue, as revealed by vaginal examination. In a certain proportion of these minor cases the local inflammation is so limited, its area so circumscribed, that it requires much care and patience in our examination to detect its presence. It may be found in the form of an indurated lump of fibrinous deposit under one or the other broad ligaments, closely adherent to them, or in the cul-de-sac of Douglas, or closely attached to one side of the uterus. Though it may give no perceptible pain whatever, firm pressure with the finger through the vagina will always elicit the characteristic *ache* and tenderness. In some of these cases the fever is unattended with chill, and is very slow and insidious in its development. For the first few days there will only be a slight quickening of the pulse every evening, and a rise of a single degree of temperature. But there is a daily increase in the frequency of the pulse and in the rise of temperature until the symptoms assume a serious form. Tympanites is usually present in the advanced stages of cellulitis, in slight or excessive degree. There is also frequently present a dry, red tongue, and often a diarrhœa that is persistent and troublesome.

These cases are not unfrequently accompanied with mild delirium at night, thus rendering the resemblance to the advanced stages of malarial or typhoid fever very decided in this general aspect. But there is always wanting the rose-colored eruption of the latter disease. In all cases of fever after labor or abortion within the month, whether pain in the

pelvis and abdomen is present or not, or whether there is tenderness on pressure over the hypogastric or pubic regions, or whether there is uneasiness or unpleasant sensations of any kind in the pelvic organs, I adopt it as a standard rule that the interior of the pelvis is to be explored carefully and thoroughly, until the local disease is detected. There is a form of pelvic cellulitis that results from abortion and arises from the presence in the uterus of a small portion of adherent placenta. Adherent placenta in cases of abortion is by no means an unusual occurrence and is a common cause of para- and perimetritis. It affords a septic material when absorbed that finds its way into the peri-uterine veins and lymphatics and produces local inflammation which causes the effusion of lymph, Nature's barrier erected for the purpose of arresting the further absorption into the general circulation of the poison. The dose of septic matter is then isolated and at least, for a time debarred entrance into the circulation, and while in this way it is prevented from inducing fatal septicæmia, it is sufficient to establish inflammation and a remittent symptomatic fever that continues until the septic cause is removed.

These cases are always obscure and are attended with no pain or tenderness over the abdomen or in the pelvis. There is no peritonitis, but a careful examination will reveal a local inflammation and lymph effusion in the pelvic cellular tissue somewhere that is the cause of the fever.

I am impressed with the conviction, based upon a very considerable experience in the observation of these cases, that a large majority of the cases of so-called puerperal malarial fever are in reality examples of obscure pelvic cellulitis. For a time in my early experience I occasionally confounded these cases myself with malarial fever. I have also seen the same mistake made in the practice of others. Puerperal inflammation in the pelvic organs is peculiarly a disease of towns and cities. It occurs more particularly among dense collections of human beings. It is rare among sparse populations. The accumulation of vegetable, animal, and excrementitious matters from the close contiguity of human life produces an atmos-

pheric sepsis, whether in the form of bacterial, animal, or chemical poison, that is liable to infect the human system in a manner that we do not see in the salubrious districts of the country. During a practice of ten years in a country district, a large proportion of which was obstetrical, I saw but one case of puerperal fever and not a single case of pelvic cellulitis, though there was never any effort at antisepsis or sanitary hygiene in midwifery. Previous to the introduction of antiseptic practice in city practice I saw cases every year, and frequently a number of them. Since that time, if I take antiseptic precautions, I never have a case of either, thus reverting back in practical results to the salubrity of healthy country life. We know that so far as the puerperal female is concerned, they are both equally liable to lacerations of the genital tract and to putrefaction of the lochia and to the absorption of this putrescent matter. We know also that the city woman gives more attention, as a rule, to cleanliness during confinement than the country woman, because more perfectly nursed. We know, also, that the country woman, during the puerperal state, has a superstitious dread of the local use of water. Yet, so-called epidemics of puerperal fever or septicæmia are unheard of in country life, and sporadic cases only at rare intervals. This is equally true of pelvic cellulitis and peritonitis.

In the great majority of cases of cellulitis coming under my observation after labor, there have been laceration or fissure somewhere in the genital tract, through which septic matter has entered the circulation. In city life if a rent occurs during labor, whether in the cervical canal, or os uteri, or perineum, however small, there is danger of septic infection. In country practice females while in labor are equally liable to laceration, yet septicæmia is extremely rare.

There is something in the atmosphere of cities peculiarly favorable to the generation of septic material in the puerperal uterus, as in the case of wounds. On the contrary, the healthy air and surroundings of rural districts are peculiarly unfavorable to its development. Hence, the line of practice is en-

tirely different in the two spheres of life, and relative to antiseptic methods is entirely different, and very justly so.

In illustration of the views advanced in this paper, I propose to present in detail the histories of some four or five cases of obscure and minor forms of pelvic cellulitis simulating malarial fever.

Case I.—Mrs. S., a young married lady of comparatively good constitution, was confined with her third child. For ten days following the case progressed favorably in every particular. Then she had slight chilliness, succeeded by fever. The fever continued to recur daily with distinct morning remissions. But daily the pulse increased in frequency, and the temperature at night rose higher, until the former reached 125 and the latter 105°. In this case there was no abdominal or pelvic pain, or tenderness on pressure whatever. The patient could bear, when seen by me, decided pressure in every direction over the abdominal regions without the slightest pain. There was no indication in this case to direct the attention of the attending physician to the pelvis, and as the season manifested decided tendencies to the prevalence of malarial diseases, it was regarded as of that character. The daily remissions in the morning and nocturnal exacerbations of fever were remarkable. The temperature would rise to 104° or 105° at night, and decline to 100° in the morning, with a copious perspiration.

There were also severe neuralgic pains in the head and limbs invariably when the evening exacerbations came on, which would disappear when the remissions returned. The tongue was densely coated, and inclined to be dry. There was progressive loss of strength and flesh, accompanied with extreme mental depression and loss of interest in surrounding objects. There was no irritation of the uterus, bladder, or rectum, but there existed a moderate degree of tympanites. Nor was there the least uneasy sensation in the pelvic organs. I am thus minute and particular in describing the symptoms in this case to show the very marked and close resemblance to malarial fever. Indeed, her physician regarded it as a well-marked typical case of typho-malarial fever.

I know no case better calculated to deceive or mislead than this. To make the resemblance still more complete, about

the fourth week the complexion assumed a genuine jaundiced hue. But the urine did not indicate the presence of bile. I find in the septicæmic stage of a considerable proportion of these cases resembling typhoid or adynamic malarial fever, the complexion assumes this peculiar icteric hue. I have seen similar instances in the practice of others. I have never observed it in any other than the grave forms of the disease. It is to be distinguished from the jaundice of malaria by the absence of bile in the urine, and also by its absence from the conjunctiva.

When this case came under my observation I found a woman in an emaciated, prostrated condition, with a pulse of 125, entire loss of appetite, with nausea and occasional vomiting, jaundiced complexion, a remittent type of fever, chills once or twice daily, and copious perspirations, dry tongue, and some degree of tympanites. Exploration of the interior of the pelvis disclosed an extensive cellulitis, decided tenderness on pressure around the uterus, and extensive indurated lymph deposits throughout the entire cellular tissue. Notwithstanding the presence of this extensive local disease, which had existed for a period of six weeks, the patient had never complained of pain in the abdomen or pelvis, or any other symptom to direct the attention to the pelvis. In this case, while no suppuration could be detected, and none ever occurred, there were manifestly general indications of pyæmia in the form of daily rigors, fevers, and perspirations.

Because of the presence of these symptoms I have been misled in other cases into the belief that suppuration existed when it did not. This patient was subsequently treated by means of twenty grains of quinine in ten-grain doses morning and night, the one-sixtieth of a grain of atropine at night for the exhausting perspirations, and the sixteenth of a grain of the mild chloride of mercury every three hours, and as much concentrated nourishment as the stomach could digest, and vaginal douches. Under this method of treatment the lymph deposits in the pelvis gradually melted down and dissolved, and the blood-formation and nutrition improved, while the

febrile symptoms disappeared, and eventually the patient convalesced favorably.

Case II.—Mrs. W., aged twenty-six, a married woman, eight days after a natural labor with her first child had some chilliness followed by fever. The lacteal secretion and lochial discharge were both of a healthy character. The fever continued to recur daily and soon assumed the type of a genuine remittent, with morning remissions and evening exacerbations. The patient complained of no pain or discomfort in the abdomen or pelvis. Nor was there the slightest tenderness on pressure. But the symptoms did not yield to treatment, and they were supposed to be due to obstinate malarial influences, and increased doses of antiperiodics were used without effect. The fever still continued to observe the remittent type. An examination *per vaginam* revealed an inflamed area in the cellular tissue on the right side of the uterus and a firm indurated deposit of lymph about the size of a common walnut that was quite tender to the touch. On the same side in the os uteri there was a small fissure. The presence of this wound explained the prime cause, the local inflammatory process resulting, and the symptomatic fever. In this case the treatment consisted of twenty grains of quinine per diem, antiseptic vaginal douches, and one-sixteenth of a grain of calomel every three hours. Under this treatment the inflammation and fever rapidly subsided and the patient was convalescent in three weeks.

The small laceration was healed perfectly by applications of a solution of nitrate of silver containing ʒss of the silver to ℥j of water. This woman has borne two children since.

Case III.—Mrs. F., a married woman, after labor with her fourth child, which was natural, had a chill followed by fever on the tenth day of confinement. The lochia continued in a normal condition and the secretion of milk was fully established. There was no pain either in the pelvic organs or abdomen, and no tympanites or tenderness over the abdomen on pressure. There was no indication whatever pointing to disease within the pelvis.

The woman resided in a malarial district and was confined during the malarial season. The fever was strictly of a remittent type and pursued its usual course, and was at first attributed to this cause. But regardless of antimalarial treatment the fever

continued without abatement. Finally a thorough exploration of the organs of the pelvis revealed a somewhat extensive cellulitis and lymph deposits. Minute doses of mercury and vaginal antiseptic douches restored this patient completely in about five weeks.

The history of these cases discloses the fact that they all had a positive remittent type of fever which was due to local inflammatory action alone.

Case IV.—Mrs. I., a married woman, aged twenty-seven, of robust constitution, some two weeks after an accidental abortion during her first pregnancy in the third month, had a sudden and decided chill followed by fever. Subsequently she had a chill and fever every day accompanied with intense pain in the head and lower limbs, but no pain or discomfort either in the abdomen or pelvis. The tongue was thickly coated and there was nausea, loss of appetite, and constipation. The resemblance to malarial fever was complete in every particular. The chill, fever, and headache appeared at regular hours every day, followed by a remission every morning that amounted almost to a complete intermission. I have never seen a case of cellulitis in which the deception was more perfect than this. The evening temperature would usually reach 103½° and that in the morning would stand at 99½°. All antimalarial remedies were lavishly used in this case without avail. The chills and fevers with vomiting recurred just as usual. The complexion of the patient now became decidedly jaundiced. But there was an absence of bile in the urine. This induced me to suspect that there were other causes than malaria in the case. A vaginal examination disclosed a very extensive pelvic cellulitis. The cellular tissue of the entire pelvis was literally filled with lymph exudation. Yet all of this vast extent of local disease had never by any indication revealed its presence. The sixteenth of a grain of the mild chloride of mercury combined with two grains of the oxalate of cerium every three hours until gentle salivation ensued, and hot-water douches restored this case after an illness of nearly two months. But previous to the administration of the mercury various methods of treatment had been adopted and failed. The sulphate of quinine

doses, iodide of potassium, repeated counter-irritation, had all been faithfully tried without benefit.

The minute doses of mercury and cerium controlled the vomiting promptly, and within a week under their influence the chills and fevers had subsided and the absorption of the extensive lymph deposit had begun and was accomplished in a reasonable time.

It will be seen that in all the cases reported the alterative action of mercury was resorted to before resolution was accomplished. I have of late years in all this class of cases, except the very mildest form, used mercury as an alterative, and with benefit. In connection with the sulphate of quinine in these attacks, I believe it to be the most potent agent in our possession to subdue obstinate inflammation, and to cause absorption of its plastic products and prevent suppuration, if not contra-indicated by some special indications.

In cases in which abscess has been developed and discharged with symptoms of pyæmia, the bichloride in combination with the tincture of the chloride of iron and hydrochloric acid are the best adapted. But in these cases of obstinate, indolent, indurated lymph deposits in the cellular tissue, minute doses of calomel, introduced gradually, effect their absorption more certainly and disperse the inflammation more effectually than any other preparation.

Case V.—Mrs. B., a married woman, aged twenty-one, with her first child, had, the fifth day after labor, a very slight chill followed by a mild form of remittent fever. The temperature rose in the evening to 101½° and declined in the morning to 99°.

This type of fever continued for ten days and subsided. The patient complained of no pelvic or abdominal pain. Neither did firm pressure over the abdomen elicit tenderness. There was no disturbance whatever of the pelvic organs. On examination there was found a very limited fissure on the right side of the os uteri and on the corresponding side at the utero-vaginal junction there was a small inflamed indurated point, with effusion in the cellular tissue, closely attached to the uterus, not larger than the end of the thumb. Here was the centre of constitutional infec-

tion. In all of its general features this case was identical in appearance with a mild type of malarial fever.

It is cited here as an example of the mildest type, or as a minor form of pelvic cellulitis simulating malarial fever. It is an instance of the minor and comparatively harmless form of the disease which has frequently come under my observation in past years. They usually pursue a mild course and terminate after ten or fifteen days in health.

This case was treated principally by means of sulphate of quinine, iodide of potassium, and antiseptic douches. These minor cases of cellulitis rarely manifest any indications of local lesion and always observe the character and usual course of mild remittents. They also very rarely tend to suppuration or extension to the peritoneum, and generally tend to spontaneous recovery.

DISCUSSION.

Dr. G. Frank Lydston, of Chicago.—If there is any place in the range of surgery that the gynecologist and surgeon should clasp hands it is in the study and treatment of the suppurative and inflammatory processes of the pelvic cavity. I think the instinct of every surgeon should teach him that such cases as the doctor has related—and which we all see occasionally—are really mild forms of pyæmic infection.

There is one important point in connection with cellulitis, and that is, that it is very often of a phlegmonous character, akin to the phlegmonous inflammation which follows dissection wounds and other processes of a septic character. It is analogous in many respects to certain forms of bubo which result from the dissemination of infectious material.

I think Dr. Cunningham's point is well taken in regard to the little tube being accused of all the crimes in the pelvic cavity. The gynecologist who read the paper accusing the tubes, doubtless forgot that in addition to Fallopian tubes there are lymphatic structures in the pelvis which have a function to perform—in other words, the lymphatic capillaries and glands which supply the uterine cavity and perform the function of absorption, some-

times take up infectious materials which produce deleterious effects in the cellular tissue within the pelvis.

There is another point in connection with the class of cases described by Dr. Brown, and that is the possibility of mixed infection. The latest theory in surgical science is that we may have several forms of microbic infection which results from a process which was originally supposed to be due to the action of one particular germ.

Dr. Bayard Holmes, of Chicago, has written an able treatise on mixed infection, which was unfortunately so abstruse that many of our physicians failed to give it the attention it should have received. Thus it has been shown that various forms of staphylococci and streptococci produce varying effects. It has been shown recently that the gonococcus of Neisser is not innocent with regard to pelvic inflammations. If there is anything established in the future that will shed light upon pelvic affections, it will be the demonstration of the correlation of pelvic inflammations in the female with gonorrhœa and kindred affections in the male.

Dr. W. L. Robinson, of Danville, Va.—I was very much interested in hearing Dr. Brown's paper, from the fact that I have seen a great deal of it. I cannot add anything so far as the history of cases is concerned. I should suppose that in old cases of septicæmia that nothing could be more certain of its diagnosis than the history he offered. I am glad to know that there is some way of curing such cases, beside that form of treatment which I have resorted to. I rely almost entirely upon the intra-uterine douche in its commencement, and whiskey so long as high fever is due to absorbing matter. A normal temperature in the morning and high temperature at night has been characteristic of the cases which I have seen. What little literature I have seen written on this subject goes to substantiate the doctor's ideas.

Dr. George J. Engelmann, of St. Louis.—We are greatly indebted to Dr. Brown for this paper; we have had the views of Dr. Price, and we have now heard the conservative side of the question. Which is correct? Dr. Price claims that all pus in the pelvis is referable to salpingitis and is to be treated by removal of tubes and, if possible, the entire abscess walls. As I said to him in a previous discussion, it is an extreme swing of the pendulum, and a great many are wont to follow these new dis-

coveries and to rush to extremes, incited by the novelty and brilliancy of the idea.

Dr. Brown's paper represents the sound sense of the profession, and however much glory is gained by our surgical achievements, however fascinating they are, and however tempting it is to follow this course, still, while it gives wonderful results and teaches much that is new and valuable, it does mischief, because there are those in our profession who do not discriminate, but follow blindly some admired authority, some bold, successful—not always successful—leader. Dr. Brown speaks of those cases which we have always called cellulitis—pelvic cellulitis—an inflammation of the subserous layers, more or less violent, and which is either the result of traumatism or of a purulent infection, which leads to the deposits and symptoms already mentioned, and the treatment of which has been so well related. These cases do exist, and we frequently meet with them, and no pus tube exists; no removal of the tube will cure them, nor is operative interference of any kind inevitable; absorption may take place and a cure follow even if pus is formed and it be healthy. But I will add, that even these cases of pus in the pelvis not due to salpingitis, are sometimes curable by laparotomy alone. I have seen these cases, after a persistence of several months, the patient steadily sinking with all the symptoms of pyæmia, and I have saved them by laparotomy, by emptying and draining the abscesses, extending high up among the intestines, but without discovering the causative pus tube. I do not deny the propriety of laparotomy for pus in the pelvis, if other means have failed, but I do deny the justice and the correctness of the statement that all pus in the pelvis is due to salpingitis.

LIGATION OF THE SUBCLAVIAN ARTERY FOR SUBCLAVIAN ANEURISM—CURE.

By F. T. Meriwether, M.D.,
Asheville, N. C.

February 16, 1889, R. S., aged sixty years, colored, male, widower, occupation blacksmith until two years ago.

About two and a half years ago he noticed a pulsating swelling over the first part of the right clavicle, attended with pain. At that time a physician was attending him and was using a liniment with some little good effect. The swelling and pain, however, gradually increased, the pain radiating over the right side of the head and down the right shoulder and arm. He experienced some difficulty in swallowing, and had a cough which gave more or less pain and caused the tumor to rise high in the neck and become tense.

No history of syphilis either acquired or congenital. Vision was practically *nil* in the right eye, but he distinguished a little with the left eye. Right pupil was contracted more than the left. Atrophy of optic nerve. Slight dimming of the lens on right side. Had a slight buzzing and deafness of right ear. Radial pulse on right side impaired and in axillary artery much so. The right carotid seemed normal. Diagnosis: aneurism of the first part of the subclavian probably involving the innominate.

On February 21, 1889, I operated at the Mission Hospital, assisted by Drs. Fletcher, Watson, and Cheesebrough. The anæsthetic used was chloroform, which the patient took nicely.

The usual incision was made for ligation of the subclavian in its third part. The external jugular vein crossed the line of incision almost in the middle and was very large, being about a quarter of an inch in diameter. It was partly dissected out and then held to one side by a small retractor. In dissecting out the

artery the brachial plexus of nerves was exposed, and one of its branches could only be distinguished from the artery by the longitudinal arrangement of its fibres. Catgut was used as a ligature, it being passed from behind forward and from below upward, thus avoiding the subclavian vein and the network of nerves. Light catgut sutures were used and iodoform and iodoform gauze were used as a dressing. Hardly enough blood was lost to stain the antiseptic solutions, certainly not more than a teaspoonful.

Patient rallied well. No rise of temperature. From ignorance, the dressing was displaced on the third day, the patient saying that "he had to scratch it." No suppuration; and on that day, the third after operation, union was perfect. A light dressing was then applied with adhesive strips to keep the patient from breaking up union. Patient walked around on sixth day. Improvement was marked in the subjacent symptoms, but the pulsation did not seem to be affected.

March 4, 1889. Patient still complains of slight pain in the side of his neck and head, and of pain on the right side of the chest, probably from an injury of a thoracic branch of the brachial plexus. He has no cough. Pulsation of the carotid of the right side exaggerated and much increased in the innominate, and an apparent enlargement of both. No thrill or bruit could be heard and the aneurism seemed smaller.

20*th*. No pain felt now and the aneurism is quite hard and firm, and is much smaller.

April 13. Aneurism very small and can hardly be felt. It is firm and hard. No pain or disturbance from it.

At the present time a small lump can be barely felt over the former site of the aneurism and the patient is perfectly well so far as the aneurism is concerned. He never feels the pain in his neck or head as before, and is in good health. He is totally blind now, having an optic atrophy with retinitis pigmentosa.

In ligation of the subclavian in its third part for subclavian aneurism fifty-two per cent. have died; in ligation for innominate aneurism twenty-five per cent. have died, while in all cases of ligation of the third part of the subclavian fifty-three per cent. have died. Most of the cases that die do so from hemorrhage resulting from septic inflammation of the artery

and perforation. In this case there was no sign of pus and union took place before the third day, due to the careful use of proper antiseptics. The mortality rate should not be high in this operation with precautions, and the chances for recovery are certainly good in every respect. To one well up in anatomy it is an easy operation, and how such ludicrous mistakes as tying the brachial plexus and the subclavian vein could have happened I cannot understand.

A UNIQUE CASE.

By Joseph M. Mathews, M.D.,
Louisville, Ky.

I desire to call your attention for a few minutes to a case that I believe to be unique in some particulars. In July of this year I was asked to see a patient in consultation with Drs. Blackburn and Corrigan.

The patient was a lady, eighteen years of age, style brunette, weight 115 pounds, height about 5 feet 7 inches. Coming into the room in a graceful manner, she gave this history of herself in a concise and intelligent way: "Eight years ago I first noticed that I was taking on a costive habit. I would go for a number of days without having an action from my bowels. It was not until I noticed that a movement was not had for several weeks at a time, and then with great pain, that I called my parents' attention to my case. They gave me purgatives; sometimes they would act; often they would not. Of course, stronger medication was resorted to, until my parents became alarmed and called in a physician. He treated me for constipation, which did me no good. Physician after physician saw me, each one treating the case very much alike. From two weeks the time extended to one month between my actions, until now the usual time is four months. At one time I went nearly seven months without a movement. At present it has been three months since I had an action, and I feel very little like it. I should also mention that for several years I have had much trouble in passing my water; so much, indeed, that I was advised by my physician to use a catheter, which I do many times during the day and night. I cannot pass water without it. About two years ago, just after I had passed the instrument into the bladder, I

was seized with great pain; withdrawing it, I had an irresistible desire to strain, and in the effort passed a good-sized stone. The attending physician took it to a chemist, and I understand that he says that it does not look like a stone that came from the bladder, but I know that it came from mine. My appetite is only fair. I am seldom hungry, and yet I eat quite enough, I suppose. I sleep badly, but that I attribute to my nervous condition."

After this recitation by the patient, we turned our attention to the parents, who corroborated in every particular what the girl had said. Recognizing that often very great deception is practised by patients, we questioned these honest folk in private, and they assured us that they had often put a watch upon the girl to substantiate or disprove her statements, and each time it proved as she said. This was easily done, as she often did not leave her room during the four months, and some one was always present with her. Her father remarked that a movement from his daughter's bowels was not only an event in the family, but to the entire neighborhood. This was due to the fact that an action caused so much pain that she could be heard screaming all over the square. She would then have a swooning spell which would last for hours, and often they would think she would die.

A careful examination of the patient was made upon the second visit, when I was accompanied by Drs. Blackburn and Vance. Following result: Tongue slightly coated; complexion muddy; pulse 60; temperature normal; no enlargement of abdomen, tympanitic or otherwise; no indurations or tumors; menses regular and normal in quantity. The patient was put under the influence of chloroform by Dr. Blackburn, and I asked Dr. Vance first to explore the bladder, the symptoms indicating that it should be done. This he did, and at first thought that he detected an encysted stone. He quickly changed his mind, however, and pronounced the bladder free from stone and in a normal condition, except that it was unusually large. Placing the patient in Sims's position, I explored the rectum. Divulsing the sphincter muscles freely, I first introduced a large-sized speculum, oval shaped, but could not find any unnatural condition. I then passed my hand into the rectum, and felt into the sigmoid flexure with my fingers; no obstruction, contraction, or impaction existed. There was present in the flexure some soft

fecal matter. I then introduced a No. 12 rectal, Wales bougie, and through it flooded the colon with hot water. The anæsthetic was stopped when we noticed that the pulse was very weak, and for fifteen minutes we thought she would die. Hypodermics of ether and whiskey, together with inhalations of nitrite of amyl, brought her around. The bad symptoms were disappearing when she went into a cataleptic condition which lasted about thirty minutes. In a few days she was back to her usual condition.

What we did in the case never seemed to affect her for good or evil. I should mention that there was no womb or ovarian complication in the case. My opinion is that it is of neurotic origin, and kept up by a hystero-cataleptic condition. I believe the history given by the girl to be truthful in every particular. The points that I wish especially to call attention to are these:

1. The length of time between the action from the bowels —averaging four months.
2. The fact that no impaction, disease, or unnatural contracted condition existed in the bowels.
3. That no odor emanated from the body.
4. The little damage done to the general health.

TWO CASES OF INJURY OF THE MUSCULO-SPIRAL NERVE IN FRACTURE OF THE HUMERUS.

By William Perrin Nicolson, M.D.,
Atlanta, Ga.

There are so many contingencies governing the final result in the treatment of fractures, and so many of these are charged to the account of the surgeon, though they are really beyond his control, that anything tending to throw light on the unusual and unexpected, is worthy of report. This view has led me to gather the facts in regard to two cases coming under my immediate notice, which are of somewhat rare occurrence, and that brought in each instance undeserved censure on the physician in charge. In both cases there was fracture of the shaft of the humerus, with resulting injury to the musculo-spiral nerve, involving paralysis and subsequent trophic changes, from which the patients have never recovered. As the literature of this subject is so meagre, I will be pardoned for giving the cases in some detail.

Case I.—Frank L., aged ten years, was brought to me in the spring of 1889 by Dr. R. A. Mallory, with the following history: About eighteen months before, he was thrown from a pony, and sustained a simple fracture of the humerus three or four inches above the elbow. He was seen by the physician a short time after the injury, and as no great effusion had taken place the seat of the fracture could be well defined, and there was little difficulty in reducing it under an anæsthetic. Good apposition of the fragments was secured, and a rectangular splint applied. On the following day, on account of swelling, the bandages were

removed, and from that time cold applications were made until the reaction had subsided. Before long the hand became œdematous and serum oozed from the fingers. At about six weeks from the time of injury sloughing of the little finger began, and following this a large part of the ring finger gradually necrosed. When the arm was taken out of splints a little later, it was found that there was a paralysis of the extensor group of muscles, and hyperæsthesia of the palm of the hand. No mention is made of the time at which the paralysis was first noted. The fingers subsequently began to contract, and after a short time could not be extended by force.

When I saw the patient he was about in the condition as detailed above. There was not only "wrist-drop," but such contracture of the flexor tendons that it was impossible, even under anæsthesia, to extend the fingers. The last two showed only stumps remaining, and the whole hand was of a dark-blue color, and cold to the touch. Attempts to manipulate the parts were very painful, on account of the great sensitiveness of the skin. There was also a decided ankylosis of the elbow-joint.

A tenotomy of the carpal extensors enabled me to get the wrist-joint in much better shape, though the bony changes had been sufficient to prevent it being straightened. The tendons of the digital flexors were found to be tense, and they could not be extended by force. It was decided to await operating on them until the wrist had improved, in the hope that time would benefit them. The wrist was placed on an anterior splint and compression made by a rubber bandage, and the use of the faradic current to the paralyzed muscles recommended.

Under this treatment I am informed that in many respects the improvement has been marked, notably the hyperæsthesia and the faulty circulation, though the muscles are in about the same condition. I am inclined to believe that there will be no permanent change in the condition of the muscles effected without some operation for the relief of the nerve.

Case II.—Mary W., aged seven years, was brought to me by Dr. Kirkpatrick, of Tunnel Hill, Ga., for consultation in reference to an injury following fracture of the humerus. There were almost the identical conditions detailed in the previous

case, with the exception that a plaster-of-Paris dressing was applied at the first dressing and in the appearance of the limb at the time of examination; there was no sloughing of the fingers. From the physician who had the case in charge at the time of the injury, I learned that the fracture involved the lower part of the shaft of the humerus, and that the reaction was very great. On removing the dressing a short time after the injury, there was found a slough in the centre of the forearm on the front aspect, though the fingers did not suffer, and it did not appear to have resulted from any unequal pressure of the bandage. Cold applications were applied for some time to reduce the inflammation, and I am not informed as to the character of the dressing used subsequently, nor as to the time at which the paralysis was noted.

When I saw the patient there was the same character of paralysis as described in the first case, and the same contracture of the flexor tendons, both carpal and digital. The hand was blue and cold, though there was not the hyperæsthesia noted in the boy's hand.

I advised tenotomy and the use of electricity, but as I was just leaving the city for a vacation the operation was postponed, and I have not since seen the patient. I learn that she will soon come for operation.

When these two cases came to me within so short an interval, I was sufficiently interested to look into the literature of the subject, and I was surprised to see how little mention of the injury can be found in the current text-books on surgery. Though mentioned by some authors, it is in most cases as though not of personal observation, but in the sense of being quoted.

Stimson says: "Injury of a nerve is shown by paralysis, loss of sensation, or hyperæsthesia in the parts supplied by it, manifesting itself immediately after the injury, or only after consolidation of the fracture and the removal of the dressing. Paralysis or loss of function indicates division or destruction of the nerve; hyperæsthesia indicates irritation, usually by pressure." I find no further allusion to the subject in his work.

Gross says: "The nerves may, like the bloodvessels, suffer serious injury, sometimes at the time of injury, from contusion, laceration, or compression by sharp fragments of bone, or more or less remotely from the manner in which they are constricted by the plasma that is effused around their trunks at the original seat of the mischief." He then gives the usual symptoms that follow nerve injury and the trophic changes that follow.

Professor Packard (*International Encyclopædia of Surgery*) says: "Occasionally cases occur in which, in the course of union of fractures of the humerus, nerves become entangled in the callus or pressed upon by it, with the result of causing pain or paralysis, or both, in the limb. Generally it is the musculo-spiral nerve that is thus interfered with." Trelat reports that a young man, in consequence of a fracture of the left arm, had an exuberant callus which, by inclusion, caused paralysis of the above-mentioned nerve. An operation was performed, the nerve being disengaged, and the projecting callus removed. Two months afterward movements began to be possible, and the functions of the nerve were restored. Tillaux is said to have referred to a similar case. He also states that two cases of wrist-drop were reported by Prof. Gross from this cause, and an operation for the removal of the callus recommended but not performed.

Prof. Agnew has also reported two cases of this character, but I think no operation was performed. He speaks of a case in a boy improving under the use of electricity, etc.

Prof. Weir Mitchell, in his work on the *Injuries of Nerves*, alludes especially to the musculo-spiral as suffering in cases of fracture of the shaft of the humerus, and quotes some of the authors mentioned above, and gives the credit of first operating for the relief of the nerve to a French surgeon many years ago.

More attention is given to the subject by Erichsen than any author that I know, and he figures in his work the characteristic wrist-drop occurring in these cases. He calls attention to cases operated upon by Ollier, of Lyons, and Whitson, of

Glasgow, in both of which the callus was removed, and a successful result obtained. He also mentions the contracture of the flexor and pronator muscles that follows on a long continuation of the paralysis of the supinator and extensor antagonists.

Recently I have been informed of a case occurring in the practice of Dr. D. H. Howell, of this city, in which a man has paralysis of the musculo-spiral distribution, as a result of a fracture of the shaft of the humerus, but there exists only a paralysis, and none of the spastic conditions as found in the cases I have detailed.

In looking over the literature of the subject, there is little of satisfaction as regards the treatment of these cases. Outside of those mentioned, and the report that has come to me through a friend of an operation successfully made by Dr. Lange, of New York, I can find no mention of the resection of the offending callus, though this seems to be the only line of treatment that offers much good.

The question as to the pathology of the injury is of much importance, and should decide the treatment. Paralysis occurring at the time of the fracture would indicate that there was contusion or laceration of the nerve, while the coming on later might point to a neuritis from the violent reaction in the surrounding tissues; or, more probably, the entanglement of the nerve in the provisional callus. Unfortunately, the limb being confined in splints, the muscular weakness is not detected, and, as in both of the cases herein detailed, there are no definite data upon which to rest.

It will be noted that in the first of these cases there is disturbance in the distribution of both the ulnar and median nerves, and the trophic changes that have done the most damage have occurred in the ulnar. This would indicate that either the lower fragment was sufficiently projected to wound this nerve, or that there was set up a neuritis as above suggested, causing the great œdema, and, subsequently, the sloughing of the fingers.

One of the principal reasons that has actuated me in report-

ing these cases is the serious medico-legal aspect that they present. In both of them there was more or less criticism of the physician in charge, and in one there were steps being already taken toward a suit for damages. It can well be understood how easily criticism could have been entertained, and yet how innocent the physician would be of any share in attaining the result.

As I trust that the opportunity for following these cases will be accorded me, and perhaps for operating upon them, I shall take pleasure in communicating them further to the Association.

LAPAROTOMY IN INTESTINAL OBSTRUCTION.

By Cornelius Kollock, A.M., M.D.,
Cheraw, S. C.

Intestinal obstruction, once regarded as one of the great bugbears of the profession, may now be said to be shorn of much of its terror, and to rank with other hitherto insurmountable difficulties that are every day being relieved by laparotomy. The danger of opening the peritoneal cavity and thereby producing fatal peritonitis, has been a cherished dogma taught in the medical schools of all countries. It is a little singular that medical men should so long have been wedded to this belief, when experience should have taught them that the peritoneum is as little liable, if not less liable, to take on inflammatory action than any other tissue of the body, and when it does become inflamed, it is always symptomatic, and depends upon some preëxisting cause. Chomel, than whom there is no more reliable authority in pathology, said more than forty years ago that he had never seen a case of idiopathic peritonitis. While few in modern times have been so bold as to dare gainsay the opinion of this learned and trustworthy pathologist, yet many have been slow to adopt the idea, and still more slow to act upon it. Even after the intrepid McDowell came to the front, and, impelled by his robust moral courage, opened the peritoneal cavity with the view of removing cysts, there were still those in the profession, both in this country and in Europe, who were more disposed to condemn the operation than to extol McDowell for his brilliant surgical exploit. While this proved that the peritoneum can be divided with impunity, there was still many

a "doubting Thomas." Some of them were of strength and prominence in the profession, who could not divest their minds of the old idea that a wound of the peritoneum was necessarily fatal. McDowell's success gave quite an impetus to abdominal surgery, and many who had previously stood aloof came forward as advocates of laparotomy. But it had to move slowly and cautiously. Both in America and in Europe it was condemned. But *festina lente* was the watchword of the advocates of the operation, and all admitted the propriety of slow and cautious movement. The celebrated Diffenbach said, as late as 1848, that any man who would open the peritoneal cavity was no better than a murderer, and should be placed in the criminal dock and tried for his life. But in time a change came over the spirit of the dream of even the Nestor of Continental surgery, and Diffenbach's views in regard to abdominal surgery were so modified that a short time before his death he expressed the opinion that ovariotomy might be justified when there was good assurance that the cyst had not formed adhesions with the adjacent parts. This was a full acknowledgment of the propriety of dividing the peritoneum. Had Diffenbach lived longer, it is probable that he would have become a successful ovariotomist and a strenuous advocate of laparotomy.

While the history of ovariotomy for the past twenty or thirty years has established the fact that the peritoneal cavity can be entered with safety, and admitting the propriety of its division for the removal of a neoplasm, there still exist, with many, a hesitancy and a dread in resorting to it for the relief of intestinal obstruction. Why this dread and hesitancy, is a question difficult of solution. But the cautious and extended researches and the brilliant results of operations by Butteau, Leichenstern, Rafinesque, and Peyrot, on the Continent, and those of Brinton, H. O. Thomas, and Frederic Treves, of England; of R. H. Fitz, of our own country, have in the minds of all thinking men, established laparotomy for intestinal obstruction as an authorized, legitimate surgical procedure. The time, we trust, is near at hand when no intel-

ligent surgeon will hesitate to open the peritoneal cavity for the relief of intestinal obstruction, when fully assured of the mechanical nature of the obstruction, and of the strength of the patient to stand an operation of as much severity.

It is useless to enumerate the various symptoms indicating obstruction of the intestines, as they are supposed to be familiar to every practitioner of medicine, nor is it necessary, were it practicable at this time, to describe the many and various forms of obstruction, for they are plain and are recognized by all.

The fact that a patient has failed for a given time to accomplish defecation, and all known remedies for opening the intestinal tube have been used and proved useless, is positive proof that there is obstruction at some point of the intestinal tube, but *where* and *what* is the nature of the obstruction, are facts that can only be ascertained by opening the cavity and inspecting the intestinal coil. In this, as in all troubles within the abdominal cavity, the diagnosis is shrouded with so much doubt and uncertainty, that it is easy to account for the hesitancy and delay that obstruct the progress of many, especially those who are timid or inexperienced in the treatment of these unfortunate patients. Sir Spencer Wells, who has opened the peritoneal cavity nearly two thousand times, is still in doubt as to the correctness of his diagnosis, and always regards his incision as an exploratory measure. Baker Brown says he is not sure what he will find in the abdominal cavity till after he has opened it.

Superadded to the doubts and uncertainties of diagnosis, is a knowledge of the fact that these unfortunate cases are sometimes relieved by the *vis medicatrix naturæ:* after a campaign of many doses of opium, drastic cathartics, and stimulating enemas, all of which avail nothing, and the patient is abandoned to his fate, the bowels sometimes give way and empty themselves of a large quantity of offensive gas and fecal matter, and a good recovery follows. Dallying with a case and waiting for the realization of such a happy result can be justified under no circumstances, and is pushing the ex-

pectant treatment to a dangerous, if not to a criminal, extent. The very large majority of fatal cases of intestinal obstruction, if a correct history of these could be obtained, would furnish convincing evidence that an early resort to surgical interference might have saved the lives of many who were by hope and expectancy allowed to perish. Since the history of ovariotomy has proved to the profession and to the public generally that opening the peritoneal cavity is now not regarded as an operation accompanied by much danger, where proper aseptic measures are used and when done by skilled hands, no surgeon should hesitate for a moment to resort to it when assured that there is obstruction of the intestines. The danger of laparotomy when compared with that of leaving an obstructed bowel to nature, is almost nothing. Not being in possession of accurate and reliable data, it is difficult to say exactly what is the mortality in intestinal obstruction. But from the admirable monograph of Dr. R. H. Fitz, read before the International Congress of Surgeons and Physicians, at Washington, in 1888; Greig Smith's *Abdominal Surgery;* Erichsen's *Science and Art of Surgery;* and the *International Encyclopædia of Surgery,* it would be safe to say that the mortality is not less than ninety per cent., if as low; whereas, in laparotomy it is not more than two per cent. A reproach has been brought upon laparotomy in intestinal obstruction on account of its numerous failures. But it should be borne in mind that many—nearly all—of these failures are due to the fact that the operations have been too long delayed. After a patient has been tormented for several days and nights by heavy doses of opium, drastic cathartics, and stimulating clysters, and his strength exhausted by violent pain, vomiting, loss of sleep, want of nourishment, and after general peritonitis has been lighted up and the blood poisoned by the absorption of noxious gas evolved from retained fecal matter, the surgeon is then called in, and if the patient fails of relief at his hands, laparotomy is condemned as a harsh and worse than useless procedure in intestinal obstruction.

It should be admitted as a foregone conclusion, that when

the bowels have failed of defecation for a given time, violent pain exists and is generally referred to a particular locality, usually in the umbilical region, the abdomen distended, tympanitic and tender, and more especially when superadded to all these indications stercoraceous vomiting appears, there is proof beyond all cavil that there is intestinal obstruction at some point. Opening the abdominal cavity, in order that intelligent search may be made for the obstruction, being the only procedure known to man by which this can be accomplished, laparotomy is immediately and imperatively demanded. Let it be done at once before the patient's strength is wasted, or visceral disorganization occurs. It is the *sine qua non* in intestinal obstruction.

A brief report of three cases that recently came into my hands will forcibly and clearly illustrate not only the absolute necessity of a resort to laparotomy in all cases of intestinal obstruction, but the importance of the operation being done as early as practicable. No long-winded consultations are in order. The decision must be quick and irrevocable. The danger of opening the peritoneal cavity is not to be compared to that of the continuance of an intussusception or a volvulus. Dallying with the case from day to day till the patient's strength is consumed, and a high grade of peritonitis has set up, is throwing away precious time and robbing the unfortunate victim of all chances of recovery.

Case I.—A stout, healthy lad, æt. eighteen years, was seized on the night of August 12, 1888, with a violent pain near the umbilicus. A physician was called, and various remedies were used, such as sinapisms to the abdomen, enemas and large doses of opium, but with no relief. I first saw the case at 6 P. M., August 13, twenty hours after the attack. He was almost in a state of collapse, bathed in a cold, clammy perspiration, and the pulse quick and feeble. Stercoraceous vomiting had occurred twice. The enemas brought away nothing except what lay below the point of strangulation. The abdomen was greatly distended and tympanitic. Feeling assured that there was internal strangulation of the bowel, I at once determined to resort to lapar-

otomy. An incision of three inches was made in the linea alba, below the umbilicus. As soon as the peritoneum was opened a coil of intestine, heavily congested, of a purplish color, made its appearance. Just at this point the strangulation was found. A diverticulum, about three inches in length, and attached at its extremity by a shred of fibrous tissue to the mesentery where it joins the gut, formed, with the ileum from which it sprang, a loop, through which the coil of intestine had slipped and become strangulated. The portion of intestine confined was released by simply dividing the fibrous band, and setting free the end of the diverticulum. This afforded immediate relief from pain, and in a short time there were one or more movements of the bowels, and large quantities of offensive gas and fecal matter were discharged. This patient made a quick recovery, and has enjoyed uninterrupted health since the operation. A delay of a few hours would have proved fatal in this case. The bowels above the strangulation were highly congested, and of a dark-purple color. The patient's strength was failing rapidly from the violence of the pain, excessive vomiting, and the want of nourishment.

Case II.—A man, æt. twenty-five years; general health had always been good until some time during the month of November, when he had violent attacks of what was called bilious colic—by the way, a very unmeaning term, which should be expunged from medical nomenclature. The pain was in the lower portion of the region of the liver, and around the umbilicus. Several times during the latter part of November, and during the month of December, a number of gall-stones were passed, varying in size from that of the head of a pin to that of a pea. This was, of course, accompanied by a violent pain, such as was experienced in previous attacks. On the night of January 2, 1889, there was another attack, more violent and distressing than any of a previous date. The physician called, supposed it was a similar attack to those of former occasions, and resorted to the treatment that had previously afforded relief. The pain, though to some extent paroxysmal, was very intense all the time, notwithstanding the morphine was administered in half-grain doses every hour or two for more than twelve consecutive hours. Immense doses of purgative material were administered, in the shape of castor oil, Epsom salts, olive oil, rhubarb, and calomel, with no benefit, but, doubtless, with more or less injury. In

the afternoon of January 4th, about forty hours after the attack, sterocoraceous vomiting came on, and the patient got rid, through the mouth, of large quantities of fecal matter, fluid, and offensive gas. This afforded more relief than all the anodynes, and the patient was able to take some milk and a little chicken broth with apparent relish. But in the course of a few hours vomiting returned, and the milk and chicken broth were thrown up in a crude and undigested state, along with more stercoraceous matter. This condition of affairs continued until 3 o'clock on the morning of January 7, 1889, nearly five days after the commencement of the attack. It was then I first saw the case. There was no doubt in my mind, nor was there any doubt in the mind of the attending physician, as to the nature of the trouble. The whole abdominal region was greatly distended, from the ensiform cartilage to the pubes, and there was much tenderness. Pulse 140, and weak; temperature 104°. In this emergency what was to be done? To leave the patient as he was, was simply to turn him over to death. Laparotomy, severe and far more dangerous under favorable circumstances, was the only procedure that offered any hope. This could not promise more than one chance in fifty, in the condition the patient was then in. The consent of the family was readily obtained, and the patient was anxious for the operation. At 6 A. M., January 8, 1889, I opened the peritoneal cavity by an incision of three inches in the linea alba, about one inch below the umbilicus, and search was made for the cause of the obstruction. The colon had become twisted on itself, and a knuckle of bowel had slipped through a slit or aperture in the omentum, and in addition a roll or band of omentum was pressing firmly upon it. The band of omentum was divided, the bowel drawn out and untwisted. This removed the cause of obstruction, and there was soon an audible explosion of offensive gas, followed in a short time by a discharge of fecal matter.

This operation was in itself a success, and the patient may be said "to have died cured," for the obstruction was removed, and all pain had entirely disappeared. Death took place thirty hours after the operation, apparently from blood-poisoning and exhaustion.

What would have been the chances of this unfortunate young man had the operation been performed earlier, is a

question difficult of solution. Being young, with good habits and good health, it is my opinion that if the operation had been done three days earlier—about the time of the first appearance of the stercoraceous vomiting, he would have stood as good a chance of recovery as any who undergoes the operation of laparotomy.

Case III.—A strong, vigorous man, æt. forty-four, of good habits, and good general health, with the exception of occasional attacks of indigestion consequent upon torpid liver. At 12, noon, on the 11th of October, 1889, after having failed earlier in the day to attend to the call of nature, he was seized with a violent pain in the bowels. Frequent efforts to relieve the bowels were made, but all were abortive. A physician was called, and the usual routine of anodynes, purgatives, and enemas were given throughout, but failed to give relief. At 7 A. M., on the 13th, about forty-three hours after the attack, I saw the case for the first time. The suffering was then intense, in spite of large and frequent doses of morphine that had been administered hypodermically. The abdomen was considerably distended, tender and tympanitic. Pulse 125, temperature 101°. Stercoraceous vomiting had occurred twice at intervals of two hours. Laparotomy was at once resorted to. An incision of four inches was made at the linea alba, a little below the umbilicus. The patient was very stout, abdominal walls thick from an excess of adipose tissue, which greatly embarrassed the operation, and caused the incision to be larger than would otherwise have been necessary. As soon as the peritoneum was divided a mass of intestines, greatly distended and highly congested, rolled out on the belly of the patient. Search being made for the point of obstruction, it was found to be an intussusception or invagination in the ileo-cæcal region. A part of the gut prolapsed, as it were, into the lumen of the adjoining portion. One portion seemed to have caught on that immediately above it, grasping it and pushing it along; which movement seemed to tend to increase the invagination more and more. The portion of intestine pushed in was composed of two layers, one entering and the other returning, thus bringing the two peritoneal surfaces in juxtaposition. It was a single intussusception, and was evidently not of very long duration, as no adhesions were formed between the opposing

peritoneal surfaces. It was, therefore, easily reduced by simply drawing out the invaginated portion. Even after the complete adjustment of the difficulty and the bowels were all in *statu quo*, there was no effort at defecation. The intestines having been greatly distended by a large accumulation of gas, fluid, and fecal matter, were evidently in a state of partial paralysis, and had lost the contractile power necessary to establish peristaltic motion. By the use of the aspirator the bowel was relieved of the gas and fluid, and then by passing my hand gently along the upper surface the fecal mass was started; and with the aid of several stimulating enemas the whole intestinal tube was now emptied of its contents through the rectum. This case is in all respects very satisfactory, easily diagnosticated, and quickly relieved. It is now a little more than three weeks since the operation. The wound healed by first intention, and the patient is now in a very comfortable condition; appetite and digestion are good, and there is no trouble of any kind about the ileo-cæcal region, or any part of the abdominal cavity.

Intestinal obstructions are not always of a mechanical nature, but may be, and sometimes are, produced by overdistention of the bowels by fluid or gas, with very little or any impactment of fecal matter. Overdistention from any cause tends partially to paralyze the muscular coat of the intestines, impairing the contractile power necessary to excite peristaltic motion, thus rendering defecation impracticable; in the same way that long-continued distention of the bladder prevents urination when there is no stricture, organic or spasmodic, and calls for catheterization. Cases of intestinal obstruction have occurred in which all the usual agents used for opening the tube have been employed with no effect. Laparotomy has been resorted to and the bowels were found distended and heavily congested, but no intussusception, volvulus, or other obstruction of a mechanical nature could be discovered. In such a case the surgeon is mortified and blames himself for his error in diagnosis. But rolling and tumbling the intestines about in the cavity while search is being made for the cause of the obstruction, will often excite peristaltic motion and a life is saved that would have been lost but for the opera-

tion. The danger of opening the peritoneal cavity is *nil* when compared to that of leaving a case of intestinal obstruction, from whatever cause, to nature. In the one, death is certain, and that after indescribable suffering. In the other the mortality is now less than ten per cent., and the pain comparatively trifling, when the operation is done by skilled and experienced hands.

Let no surgeon then, with a knowledge of the results of laparotomy, stand by with folded hands and see a fellow man die from intestinal obstruction.

THE SURGICAL TREATMENT OF EMPYEMA, WITH CASES.

By James A. Goggans, M.D.,
Alexander City, Ala.

From the fact that pleurisy is one of the most common diseases of the respiratory organs which we encounter in general practice, it seems to me that a short study of the form known as *purulent pleurisy*, or empyema, would be interesting to the members of this Society. The term empyema was originally applied to any accumulation of pus, but it is now restricted to pus in the pleural cavity.

Ancient writers, from the days of Hippocrates and Galen, recognized and treated this disease by thoracentesis and thoracotomy; still, their knowledge of the true pathology of the disease must have been quite limited.

Many times since the days of the above-named writers these operations have fallen into disuse; but thanks are due now to Trousseau and Bowditch for having removed almost all prejudices against them.

Formerly, one of the principal objections to the operation of thoracentesis was the fear of admitting air into the pleural cavity. It was thought that the contact of air with the pleura in cases of sero-fibrinous pleurisy changed the fluid into pus, and that in cases of empyema, the presence of air favored decomposition of the pus, resulting in the formation of deleterious gases, thereby increasing the prostration of the patient. I believe, however, that most surgeons of the present day agree that the admission of a moderate quantity of air is not attended with danger; besides, another argument in favor of

the operation is the fact of our having a great variety of improved instruments by which we are enabled to perform the operation without the admission of air.

It is an undisputed fact that the tendency of suppurative pleurisy is *never* toward recovery, except by spontaneous openings. This necessarily renders the prognosis exceedingly unfavorable. There is considerable room for differences of opinion as to the treatment of sero-fibrinous pleurisy, but not so with empyema. The diagnosis of purulent pleurisy having been made, first by the rational and physical signs, and verified by having drawn off some of the fluid and subjected it to a microscopic examination, there is only one alternative, viz., to evacuate the pus by *some* means. The only exception to this rule is, where the empyema is a result of phthisis. It is stated by no less authority than Bowditch that the mortality is increased by operating in these cases. I will state that the general conclusion of all surgeons of the present day is, that when pus is found anywhere in the body, that it must be let out.

As to the mode of evacuating the pus, I think that the profession is generally of the opinion that thoracentesis by aspiration should be given a fair trial before resorting to thoracotomy. It is said to be eminently successful in children, and very often successful in adults.

If aspiration is performed, nearly any modern instrument will do good work. I have always used Potain's modification of Dieulafoy's aspirator. It is of simple construction and effectually prevents the possibility of air entering the pleural cavity.

Before making the puncture the instrument should always be tested to see that its action is perfect by evacuating the receiver and immersing the point of the needle in water. The needle selected should be of good size, thoroughly cleansed and dipped into carbolized oil.

Most authors recommend the sitting posture to be observed by the patient during the operation. However, if the circulation is weak, and the patient much emaciated, a dose of mor-

phine should be administered hypodermically, a moderate quantity of alcoholic stimulant given just before the operation, and the patient allowed to observe the recumbent posture.

I have always given the morphine to adults, and the camphorated tincture of opium to children before tapping, believing that the opiate very materially lessens the pain and shock caused by the introduction of the needle, as well as going a great way toward lessening the dangers of the operation from the sudden withdrawal of the fluid.

The point selected for making the puncture must necessarily vary with the quantity of fluid present in the pleural sac. The general rule is to select the lowest admissible point, unless there is bulging at some point on the chest walls, and then the puncture should be made there. If the sitting posture is to be observed by the patient, the body should be placed in as nearly an erect position as possible, except that it should be made to incline a little forward, with the arm of the affected side thrown partially across the chest, the hand resting on or about the opposite shoulder. The index finger of the left hand should be used as a guide for the needle, by gently pressing it into the intercostal space at the point selected for making the puncture. Some surgeons advise that the puncture should be made by first cutting through the skin with a knife or lancet and then introducing the needle. I do not see that this adds any advantage to the operation. The point selected for making the puncture should be thoroughly washed with some antiseptic solution, and the needle introduced by a quick motion, the point being directed a little downward. By directing the point downward we lessen the possibility of striking the lower border of the superior rib or of puncturing the intercostal artery. The amount of fluid to be withdrawn at a single operation will depend entirely upon the length of time the lung has been compressed. Our object should be to evacuate all the fluid possible without causing pain and dyspnœa. It should be allowed to flow away very slowly, and the operation should be terminated just so soon as the patient experiences the least uneasiness in the chest, however small

the quantity withdrawn may be. By observing these rules closely the lung has time to expand, and the dangers of pulmonary congestion are much diminished. Before withdrawing the needle the suction of the aspirator should be cut off by turning the stopcock, thus lessening the dangers of drawing the septic fluid into the walls of the chest, which might result in septicæmia or the formation of fistulous openings. I have observed these rules as closely as possible in making 138 punctures for the relief of sero-fibrinous and purulent pleurisies, and I have never had a single accident, beyond a slight cough and temporary dyspnœa. Some surgeons tell us exactly how many aspirations should be performed before resorting to thoracotomy. Richardson and Parker, of London, advise that after two aspirations, if unsuccessful, incisions should be made. Flint and Anstie advise that aspiration should first be used, and, if not successful, then incisions should be made. Bowditch states that there is no immediate call for thoracotomy, unless the pus becomes impure or the physical condition of the patient demands it. Statistics show that recoveries have taken place after from one to seventy-three aspirations.

From this fact I am obliged to adopt the plan of treatment as recommended by Dr. Bowditch as being the best of any I have yet noticed.

However, when the pus becomes fetid, and the pleural cavity refills rapidly after aspirations, and there are evidences of hectic and rapid emaciation, thoracotomy should be performed at once. And another condition under which I would urge the operation is in any case where, after one or many aspirations had been performed, and there were symptoms of threatening perforation through the lung; since I had occasion to perform the operation under these circumstances in one case where there was some pointing, and the patient had severe attacks of coughing, and expectorated as much as one ounce of pus of exactly the same quality as drawn from the pleural cavity just afterward. Repeated aspirations failed to

relieve him, and thoracotomy was finally performed; the patient made a good recovery.

By making free incisions in such cases a double purpose is accomplished: 1st, thorough drainage, thus relieving the impending suffocation from the pressure of the fluid; 2d, getting rid of the pus, which is deleterious within itself. When spontaneous openings occur, they are usually inadequate for perfect drainage, and counter-openings have to be made, as the prime object is to have the pus escape as rapidly as it is formed.

The operation of freely opening the chest is a simple operation in one sense of the word; still, one naturally revolts at such a procedure. When we refer to the statistics of the earlier operations we notice that it has several times been abandoned. The statistics of more recent years, however, show such flattering results that the surgeon who now fails to perform thoracotomy under the conditions enumerated brings upon himself the responsibility of a very large mortality, even after there is pointing, which is indicative that the pus would soon be evacuated by a spontaneous opening.

I do not believe that the chest should be opened by plunging a bistoury into the pleural cavity after the manner of opening a simple abscess; but, by carefully dividing the tissues down to the pleura, and then thrusting a grooved director into the cavity, and dividing the pleura on the director. By so doing we lessen the dangers of puncturing the lung or dividing the intercostal or internal mammary arteries.

The point selected for making the incision should be at the most dependent point possible where the walls of the chest are thin, and this will generally be in the sixth, seventh, or eighth intercostal space, just in front of the anterior border of the latissimus dorsi muscle. If, however, there is pointing at some other part of the chest-walls, the incision should be made there.

The performance of this operation demands some kind of an anæsthetic, either local or general. After making the incision, which should be at least an inch in length, the fluid

having escaped, and air having been freely admitted in its stead, some kind of drainage-tube should be introduced. I do not believe that the introduction of a double drainage-tube, as recommended by some, is necessary. I have used pieces of male catheter, silver tubes with protecting collar, pieces of soft rubber, and, on one occasion, used a large-sized Gruber's ear speculum, after shaping it so that it would pass between the ribs readily. I think the soft-rubber tubing is far preferable to any of these articles. The dressing should be applied as quickly as possible after the operation is completed, and should consist of several layers of antiseptic gauze, which should be renewed as often as two or three times in every twenty-four hours.

The patient should be instructed to keep constantly changing the position of the body, and resorting to forced inspirations, thereby completely evacuating the pus from the pleural cavity as rapidly as it is formed, thus allowing its size to be constantly diminished, and finally become completely obliterated. There is a difference of opinion as to the advisability of washing out the pleural cavity after the operation of thoracotomy. Sir Joseph Lister and Prof. Loomis are much opposed to it. Most authors, however, speak in the highest terms of washings, claiming that the dangers of septicæmia are much diminished and the abscess cavity much more quickly obliterated. I have never resorted to medicated washes, but contented myself with using warm water that had been boiled. I believe this to be the least irritating wash that can be used.

Illustrative of this plan of managing empyema I will give the histories of three cases occurring in the same family at the same time. They were cases of influenza complicated by pneumonia, pleurisy, and empyema.

Case I.—Male, seven years of age. Had influenza complicated by pneumonia in March, 1889.

April 27. Pulse 98; temp. 99½°. Decided dulness over the right side of the chest. Removed by aspiration four ounces of pus.

May 2. Pulse 102; temp. $100\frac{1}{2}°$. Removed eight ounces of pus from between seventh and eighth ribs in the axillary line.

5*th*, 9 A. M. Pulse 110; temp. $99\frac{1}{5}°$. Removed four ounces of pus.

8*th*. Pulse 115; temp. $100\frac{4}{5}°$. Has considerable cough with some expectoration. Removed six ounces of pus.

9*th*. Pulse 76; temp. 98°. Slept well last night. Calls for food.

10*th*. Pulse 100; temp. $99\frac{3}{5}°$. Removed three ounces of pus.

11*th*. Pulse 96; temp. $98\frac{2}{5}°$. Takes plenty of nourishment.

12*th*. Pulse 100; temp. $99\frac{1}{2}°$. Has taken too much food, and passing blood from the bowels.

13*th*. Pulse 130; temp. $102\frac{3}{5}°$.

14*th*. Pulse 100; temp. $99\frac{2}{5}°$.

15*th*. Pulse 110; temp. $99\frac{2}{5}°$. Removed one ounce of pus.

17*th*. Pulse 115; temp. $102\frac{1}{5}°$. Removed three and a half ounces of pus.

18*th*. Pulse 100; temp. 99°. Much more comfortable.

19*th*. Pulse 118; temp. $102\frac{3}{5}°$. Removed three ounces of very thick pus.

21*st*. Pulse 90; temp. $98\frac{1}{2}°$. Removed one ounce of pus.

23*d*. Pulse 120; temp. $100\frac{1}{5}°$. Removed one ounce of thick pus.

28*th*. Pulse 100; temp. $98\frac{3}{5}°$. There has been considerable improvement since the last aspiration.

30*th*. Pulse 84; temp. 98°. He is much better; able to sit up in bed.

June 4. Pulse 90; temp. $98\frac{1}{2}$. He is up and walking about the room. From this time he made a rapid and complete recovery. There were in all eleven operations performed.

CASE II.—Male patient, seventeen years of age. Had influenza and pneumonia, followed by abscess of the lung, which discharged large quantities of pus by expectoration from April 10 to May 28, 1889.

May 29. Cough had entirely ceased. Pulse 110; temp. 100°. Circumscribed dulness over the abscess cavity about the middle of left side of the chest. Removed by aspiration six ounces of very offensive pus, and got all that would flow through the instrument. There was no cough or distress of any kind when the operation was completed; but the cough was set up in one hour

afterward, and he expectorated eight or ten ounces of very offensive pus within the next twelve hours.

May 30, 8 A. M. Pulse 88; temp. 98°. Expectoration has entirely ceased, and he is very comfortable. 7 P. M. Pulse 84; temp. 97½°.

31*st*, 7 P. M. Pulse 72; temp. 97⅕°. Still no expectoration. Great retraction of the chest walls in the locality of the abscess.

June 8. Pulse 80; temp. 98½°. He made a complete recovery.

CASE III.—Male patient, twenty years of age. Had influenza, and on March 16, 1889, had a chill and developed pneumonia in the right lung. There was no decided crisis, and on April 12th removed thirteen ounces of pus from between the seventh and eighth ribs in the axillary line. At this time pulse was 92, temperature 101°. The cough had ceased. When thirteen ounces of pus were removed he had some constriction about the chest, and the operation was ended.

April 14. Pulse 90; temp. 99⅘°. Has slept well since the operation.

15*th*. Pulse 96; temp. 99⅕°. Has had to have morphine to procure sleep. Removed six ounces of pus, when the operation had to be terminated.

16*th*. Pulse 84; temp. 99⅘°. Has slept well since the operation.

18*th*. Pulse 92; temp. 100°. Symptoms of accumulation. Removed thirty-two ounces of pus. The puncture was made in front, between the fourth and fifth ribs.

19*th*. Pulse 80; temp. 98½°; resp. 22. Is very comfortable this morning. It will be useless to give the daily record of this case, since it would fail to be interesting from the great length of time through which it extended. Suffice it to mention that up to July 15th 45 aspirations had been performed, and 351 ounces of pus had been removed. On July 15th removed 8 ounces of very offensive pus. Thoracotomy was advised, but the patient would not consent to the operation. When the forty-ninth operation was performed the fetor had entirely disappeared.

The work of removing the fluid by aspiration continued to the seventy-third operation, when 500 ounces of pus had been removed. The operation of thoracotomy was then urged, and was performed on September 14th. At this time the pulse was 112, temperature 99⅕°. Ice was used as a local anæsthetic. An in-

cision about an inch in length was made through the skin and other tissues down to the pleura between the fourth and fifth ribs in front. A grooved director was then thrust through into the pleural cavity, and the pleura divided on the director. The point in front was selected because there was some pointing there. Five or six ounces of pus escaped, and air was freely admitted in its stead. A piece of soft-rubber drainage-tube was introduced, and the dressing applied, which consisted of several layers of antiseptic gauze. From the day of the operation to October 1st, about two ounces of pus were discharged per day. The pulse was then 110, temperature 100°. Commenced to irrigate the abscess cavity with warm water on October 1st.

November 1. Pus cavity has been irrigated since October 1st, now holds only a drachm or two of fluid. No pus discharged, only what would come from the track of the tube.

8*th*. Patient still wearing the tube, and able to walk a mile or two. If he continues to do well, I think that the tube can be removed in a short time.

Several times during the treatment of this case, it appeared as though he would certainly recover under the use of the aspirator, when there would suddenly be a renewal of the pleuritis, followed by an abundant secretion of pus. This patient had a hypodermic of morphine and a potion of brandy before every operation that was performed.

Of course, during the progress of such cases as these, cod-liver oil, syrup of the iodide of iron, and other tonics are indicated, and they were administered.

*

PUERPERAL ECLAMPSIA.

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Puerperal eclampsia involves that peculiar variety of convulsions seen only in the puerperal state. They may take place at any time during the period of utero-gestation; but occur oftener during the latter months of pregnancy; most often during the process of labor; sometimes after its completion.

They have been fancifully classified by some writers in three forms: the hysterical, the epileptic, and the apoplectic —upon certain grounds which I cannot regard as tenable.

It is true that epilepsy may occur in any parturient woman, and at any time during the parturient state. And it is equally true that hysteria not infrequently accompanies that condition of nervous exaltation and irritation common to the period of pregnancy.

Nor is there any reason why a woman *enceinte* may not be seized with an apoplectic fit, at her work, or asleep, or in labor, or at any other time.

But eclampsia gravidarum is a disease *sui generis*—a disease with its own symptomatology, its own etiology, and its own obscure and uncertain pathology.

Epilepsy, whilst it sometimes gives warning by a kind of an aura which an intelligent patient will recognize as premonitory and precursor of an instant attack, yet, as a rule, seizes its victim of either sex, at any time and at all seasons.

But eclampsia occurs only in the female—and only in the parturient female, and (as its synonym in the Greek signifies)

"flashes its light" in the patient's eyes, for hours, may be for days, before the outburst of the storm—a signal which she does not understand, but which brings clear, marked, and definite information to the accoucheur who may be on the outlook.

A persistent headache in the gravid woman, especially if it occur during the latter months of pregnancy, or at the inception of labor, tinnitus aurium, amblyopia, flashes of light alternating with partial blindness, numbness of the hands, imperfect memory, and especially if these symptoms be followed or accompanied with œdema of the face, scanty secretion from the kidneys, or the presence of albumin in the urine, indicate as clearly as certain signs in the heavens betoken the tempest, the coming on of that most fearful and most dreaded of all the complications of the puerperal state —puerperal convulsions. It is true that the first convulsion simulates an attack of epilepsy very strikingly. But apart from that peculiar cry of the epileptic which often inaugurates the attack, and which I have never heard in puerperal eclampsia, the convulsion itself presents to the eye of the observer certain characteristics not seen in the case of the ordinary epileptic.

When the eclampsia is immediately announced in the puerperal woman, the spasm for twenty seconds, perhaps or more, is of a tonic or tetanic character, as evinced by the fixed eye, the contracted pupil, the drawing of the orbicularis oris causing the simulation of a smile, the tension of the cervical muscles bringing backward the head, the swelling of the jugulars, the suspension of respiration. After this there is sudden and complete relaxation, a long stertorous or hissing inspiration; and clonic convulsions of the whole muscular system ensue, especially violent in the face and upper extremities. This may continue for a minute or two, rarely longer at the first attack, when the convulsive movements suddenly cease, and the patient falls into a deep sleep, for a day or an hour, or greater or less time according to the intensity of the cause,

the susceptibility of the subject, or the efficacy of the treatment; after which the same phenomena may be repeated.

If convulsions occur before full term, and unprovoked by uterine and recurrent pains, a day, perhaps many days, may elapse before another attack; and I have seen instances in which there was no repetition of the disease, even when labor supervened.[1] Usually, however, there are from one to twenty attacks during twenty-four hours, unless labor is sooner ended. Some authors report as many as seventy a day, and one writer (Depaul) as many as one hundred, that is one about every eight minutes. I have seen one case in which they were almost continuous for twenty-four hours, or rather in which, after the first six or eight regular convulsions, the muscular clonic spasms of the whole body were continuous—more nearly resembling a case of exaggerated chorea, with unconsciousness—and so constant and so powerful that I saw two physicians fail, after a half hour's trial, to hold the patient still enough to get her under the influence of chloroform. Indeed, it was impossible to hold her at all, except at the risk of breaking her neck. For this same reason we could neither effect delivery by forceps or by turning, and had simply to lay down our arms and confess to defeat. The most wonderful part of the story is, that the baby was eventually born without hurt, after this long and tumultuous labor, and the mother made a good recovery except as to her vision; she was blind for several days before labor set in and for several weeks subsequently. There was no sort of renal deficiency in this case, but rather an excess in the quantity of urine, though it was loaded with albumin and casts. These gradually disappeared under treatment, and, at the end of six months she could see well enough to go about and attend to her domestic duties. I took her at that time to a specialist of repute in a neighboring city, and asked for an examination of her eyes and for glasses. He at once recognized the yellow disks on the retinal field, and, without any knowledge of the

[1] I have seen an instance of this since this paper was written.

history of her case, pronounced it Bright's disease; undoubtedly a correct diagnosis. She is alive, however, now, at the end of four years; is well, and has vision sufficient to read coarse print, and to do her own sewing.

After the history of such a case, I cannot accept the prognosis of Dr. Lusk, which he formulates from the reports of the New York Board of Health from 1867 to 1875, viz., one death in every eight cases of puerperal eclampsia.

The prognosis in all cases is certainly very grave, but the average mortality, I think, has been exaggerated. I am sure it has not been so high as that in my own cases.

The disease is one fearful to look upon, and one which excites our liveliest apprehensions, not only of present danger, but of future evil; yet, after the most violent and persistent convulsions, the woman often falls asleep as soon as labor is terminated and will sleep two days if undisturbed, when she will awaken a little sore and shaken up, with no serious results following, and will enter at once the road to rapid convalescence.

Puerperal eclampsia is rated by most writers as a rare disease—the percentage of cases being about one to every five hundred labors. Here, too, my experience differs from that of recorded authority. In my own cases there has been nearly one in three hundred.

I have referred to the uncertain and obscure pathology of the disease. I think I have not stated this condition of uncertainty too strongly. We can state, perhaps, with some degree of assurance, that there is generally some renal deficiency in the majority of cases of eclampsia gravidarum—an insufficiency often associated with the presence of albumin in the urine. Dr. Lever, as far back as 1842, in *Guy's Hospital Reports*, called attention to this fact. Soon after it was noted by a number of observers; and Frerichs in 1851, and Brown five years later, accumulated such an amount of supposed evidence to the same effect, that medical men began to believe that eclampsia was little else than uræmic intoxication. Subsequent observers, however, and notably Seyfert,

with most extraordinary opportunity for investigation in the great Maternity Hospital at Prague, reported a number of cases disproving this heretofore accepted theory. Seyfert alone reported seventy cases of parturient women suffering with nephritis, and only two cases of eclampsia amongst them.

Then followed the theory of a ferment in the blood converting urea into carbonate of ammonium—Frerichs still in the lead—then the Traube-Rosenstein theory of hydræmia in all pregnant women, taken up by Andral and subsequently disputed by Lohlein, who failed to find, in nineteen examinations of the cadaver, more than one case of œdema or anæmia of the brain.

Of course, it has long been known that convulsions will ensue on conditions of extreme anæmia of the brain. This has been observed in cases of animals and soldiers dying of hemorrhage, and was the subject of demonstration by Brown-Séquard many years ago. But if the subjects of puerperal convulsions, with very few exceptions, ever exhibit any evidence of anæmia during life or death, the observations of other medical men have been widely divergent from my own. Indeed, for what class of patients do we fear this terrible complication in our obstetrical cases? Do we apprehend such danger for the pale, the enfeebled, the anæmic, or for the robust, the plethoric, the red-blooded, the full of habit? What class of patients, here in this country at least, in the experience of all people, learned and unlearned, professional and unprofessional, are usually the subjects of convulsions during labor? Who fear it for themselves? And for whom do careful and loving friends fear it? Truly, there are some questions which common sense can answer as correctly as science.

And yet another theory has been advanced in reference to the etiology of eclampsia, viz., that the pressure of the gravid uterus upon the kidneys, and the obstruction to the renal circulation thus occurring, bring about the result of deficiency in the secretion from these organs, and the consequent accumulation of urea in the blood. But if pressure of the gravid womb be capable of producing such serious results, why should

not the pressure of an ovarian or other abdominal tumor produce similar results? Has any such case been recorded?

And yet another theory has been published, viz., that eclampsia and albuminuria are both the effect of the same cause, and that one is not the sequence of the other; that both are due to the circulation in the blood of a certain insidious and toxic element not yet determined—referring, I presume, to the *microbe of eclampsia.* This, however, has not yet been captured or cultivated, according to the latest reports on bacteriology to which I have had access.

To me the most plausible explanation of the relationship between albuminuria and the condition of pregnancy—for that there is some relationship in the majority of cases we must all admit—lies in the fact demonstrated, I believe, by Frankenhauser, of the direct connection between the ganglia of the kidney and the nerve filaments of the uterus by means of the sympathetic system.

In searching the brain or spinal marrow with microscopic lens, as if for ocular proof of organic cause of every deviation from normal function, the modern physician seems in danger of ignoring all eccentric irritation as *casus mali.* In eclampsia infantum how seldom is the seat of the trouble in the nervous centres? How often elsewhere—in a tooth, for instance, in process of eruption, in the stomach, in the colon?

And so of puerperal eclampsia, we seem to forget that it occurs only in the parturient woman, oftener in the primipara, or in cases of doublets, or of foot or hand presentation, or other complication of labor giving rise to extraordinary irritation of the womb; in other words, creating unwonted eccentric irritation. We seem to lose sight of the additional fact, that the parturient woman, and especially the primipara, is often in a condition of mental, moral, and physical excitability, awaiting her time in the prospect of a new, untried, and fearful danger; that her womb, fretted and oppressed with an unused and wearying burden, is straining to throw it off, and telegraphing its troubles to the brain, already, itself, sharing the general alarm, if not poisoned and intoxicated with uræmic

blood. And what can be the result but an explosion of neurotic force finding its vent in the convulsive throes of eclampsia!

Treatment.—When the puerperal woman is under the care of a regular medical adviser he will, of course, visit her during the latter months of her pregnancy, and satisfy himself as to any signs of impending trouble. He will especially inquire if there be any renal deficiency, if there be any constipation, headache, abnormal vision or blindness; will observe if there be any œdema of the face or extremities, and will test the urine for albumin. If one or more of these symptoms be present he will institute the treatment promptly, without awaiting any nervous explosion. He will put the patient on plain digestible fare, will forbid any worry or excitement of mind or body, will regulate the bowels with an occasional dose of blue pill, followed by Rubinat water or Rochelle salts, or some saline laxative; will direct the daily use of Vichy or lithia water, or even the acetate of potash and infusion of digitalis, if the kidneys be particularly torpid. On the occurrence of headache, or of wandering pains in the back or extremities, he will direct a dose of antipyrin every three or four hours until relieved; or, if the urinary secretion be well established, will inject a sixth of a grain of morphine and one one-hundred-and-eightieth of a grain of atropine under the skin, and repeat this treatment as often as is necessary to afford relief.

But if, in spite of all precautionary measures, nervous symptoms ensue, and eclampsia be threatened or occurs, he will reduce at once the amount of circulation through the brain by venesection, administer thirty grains of chloral and thirty of bromide of potassium by enema, and await results. How long? Until labor sets in? Or shall measures be at once adopted to inaugurate that event and to hasten the delivery of the child? These are questions difficult to answer, and each physician must decide for himself the line of practice most appropriate in each individual case. I believe that the majority of men favor the conservative plan of awaiting the inception

of natural labor. Speaking for myself, there are few cases in which I would not prefer to wait. I have on several occasions regretted inducing premature labor, and on more than one occasion, when present as physician or consultant, have had cause to fear that the patient lost her life from shock incident to the rapid dilatation of the *os uteri* by the fingers of the accoucheur and delivery by turning. So confident am I of this that I will never again be responsible for the practice of hastily and rudely entering the womb and removing its contents.

When labor has already fully set in, then, under the relaxing effects of chloroform and chloral upon the patient, especially if their exhibition be preceded by venesection, the physician will not have long to wait. Turning, or delivery by forceps, affords them an easy solution to one indication, viz., the removal of the eccentric and provoking cause of the convulsions.

The entire causes, the plethoric condition of the bloodvessels, and the consequent pressure upon the enlargement of the brain, the hydræmic condition of the blood which exists in some cases, the uræmic poison which corrupts it in other instances, may, one and all, demand our attention, especially in a patient who has not been subjected to any previous treatment, but to whom the accoucheur has been instantly summoned in the hour of danger. In such cases I regard bleeding as the sheet-anchor of safety and the lancet our hope and stay.

I found this the treatment when I came upon the stage of practice, more than three decades ago. I followed it then, and in all the vicissitudes of theory and changes of practice which have occurred in that time, I have never changed my opinion or swerved from my course.

On the 17th day of July, 1851, just thirty-eight years ago, and soon after I put up my sign as a solicitor of practice, I was called to see a woman thirty years of age, expecting to be confined of her second child. She was very robust, and plethoric to a degree not often seen. Quite an intelligent midwife was with her, who said she was summoned to Mrs. H. four hours before, and finding her

with headache, and partially blind, had opened a vein and bled her four teacupfuls, or about sixteen ounces. I found her restless, delirious, blind, moaning, with head, face, and extremities swollen and livid. The nurse said that she had had a slight convulsion before we saw her. I at once reopened the vein and took thirty ounces of blood *pleno rivo.*

On examination there was no evidence of labor having set in, and another doctor was summoned for consultation. During the hour that I awaited his arrival she had two most violent convulsions. On his coming we determined to bleed her again—thirty-two ounces more—and to await the supervention of labor before interfering with delivery. I was left with her for the night. This was at 5 P.M.

I applied evaporating lotions to the head, opened her bowels with an enema of spirits of turpentine, and remained by her until morning. She rested fairly well, having had only two slight attacks during the night.

On the following morning, July 18th, at 9 o'clock, labor pains commenced, and within an hour she had several most violent convulsions, and became entirely unconscious.

Another physician was now summoned—a man of large experience and national reputation. On examination, the os was about the size of a silver dollar, but rigid and unyielding, and the head was felt presenting. The patient's face was livid, temporals and jugulars swollen, pulse 100, hard and full, and you would not have supposed, from her appearance, that she had lost a drop of blood. The big doctor ordered the vein to be again re-opened, and bled her forty ounces; then an enema containing thirty grains of asafœtida and thirty drops of laudanum. For two hours more the patient had no further attack, was unconscious, but quiet, except during the pains of labor, which now progressed very satisfactorily, and we concluded not to interfere. At the end of the fourth hour Mrs. H. had two most violent convulsions in rapid succession, and was delivered *per vias naturales* of a living child.

During the two hours subsequent to delivery she had several slight attacks, but under another enema, of musk, morphine, and assafœtida, she soon fell into a profound sleep, and had no more. In two days she recovered her sight and consciousness, and had a rapid and complete recovery.

In reviewing the case we found that she had lost 116 ounces of blood by venesection in forty-eight hours, beside a pretty profuse flow during the third stage of labor. This treatment seems at least to border on the heroic. For myself, an excuse might be made that I was very young and inexperienced. But I had the counsel and assistance of older and better doctors. And I have now to say, after an enlarged experience of thirty-seven years, that I have no apology to offer for my practice. More than that, I did nothing then which I would not do again under the same circumstances. I omitted then that which I would not omit now, viz., the use of chloral by enema, and of chloroform by inhalation. But this occurred nineteen years before Liebrich had given us the great hypnotic and antispasmodic—that incomparable remedy for reflex irritation in the nervous centres. And whilst Simpson had used and suggested the use of anæsthetics in natural labor, no man, to my knowledge, had used it on this side of the Atlantic, and my old preceptor had published his anathema upon any student or physician who would dare to attempt it. It contravened the law of God, who had declared as punishment for primæval sin, that woman in pain and labor should bring forth her offspring. Now, both chloral and chloroform are daily remedies, placed in juxtaposition, powerfully auxiliary to the lancet, and sometimes superseding its use.

Of course, I have never seen another woman from whom I could, or would, take 116 ounces of blood in forty-eight hours for any malady; but I have seen very few whom I could not, and did not, bleed very generously in eclampsia gravidarum.

I have, unfortunately, met with a great many cases of puerperal convulsions in my practice—more, I have sometimes thought, than my share; and whilst I cannot claim, with Chailly-Honore, that I have saved eighteen out of nineteen with the use of chloroform, and without venesection; or, with Professor Baum, that I have saved all of my cases with chloroform alone, yet I will guarantee as good a record as can be found in any clinical history or private or public practice in this country.

THE TREATMENT OF ORGANIC URETHRAL STRICTURE.

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The definitions of stricture as given in the text-books are vague and inaccurate, including many conditions which we do not recognize as stricture. By a general consensus of opinion, however, the term is limited to an unnatural narrowing of the urethral calibre, due to pathological changes in the mucosa and peri-urethral tissues. No amount of simple inflammatory thickening of the mucous membrane is sufficient to constitute stricture, or produce retention of urine in a previously normal urethra. There must be a peculiar change in the mucous membrane rendering it more or less pervious and permitting urinary infiltration into the peri-urethral structure, a condition which has been very clearly described by Dr. John P. Bryson, in a paper read before the American Association of Genito-Urinary Surgeons, May 21, 1889, in which he suggests the name "chronic contracting peri-urethritis" as better expressing the pathological condition.

Dr. Reginald Harrison, of Liverpool, in his Lettsomian lectures, 1888, was the first surgeon to demonstrate clearly the etiological factor of primary changes in the mucosa as the "essential though passive element in the production of stricture." Without that peculiar change, no matter what degree of inflammation may exist, stricture is never produced. When, however, that change has occurred, "urine leakage" takes place and stricture is the consequence.

The adventitious tissue developed as the result of urinary

infiltration is the active factor in the production of stricture. This new tissue, the characteristic feature of which is a tendency to contract indefinitely, continues to be developed so long as leakage exists, and the development seems to be a conservative attempt on the part of nature at limiting the extension of the disease and preventing the formation of urinary fistulæ.

Were it not for this process, we would have active and extensive inflammation, with the serious consequences so frequently observed to follow trauma of the urethra, instead of a slowly progressing peri-urethritis.

Bryson, in a paper already alluded to, has demonstrated the existence of a dilated condition in front of as well as behind the strictures. He accounts for this state of affairs by supposing the mucous membrane to have lost its natural elasticity as the result of the previous inflammation.

That stricture is the result of the changes above alluded to, seems to me to have been fully demonstrated and entirely consistent with the clinical history and pathological anatomy.

In this paper it has not been my intention to enter into an exhaustive consideration of the etiology of stricture, but simply to present the more prominent facts, a knowledge of which is essential to a rational treatment of the condition. I have alluded briefly to the essential etiological factors, without discussing at all the various inflammatory conditions capable of bringing about that change in the mucous membrane, which is the beginning of organic stricture. Nor have I made any allusion to congenital narrowings of the urethra, as they do not come within the scope of this paper. By far the larger number of strictures are found anterior to the cut-off muscle. In character they are (1) soft, according to Keyes; (2) simple fibrous; (3) nodular.

The soft stricture is often met clinically, and is capable of causing retention though there be but slight organic change. The retention in these cases is due to spasm induced by the constant irritation. The spasm is often so intense as to prevent the introduction of a filiform bougie, while a larger in-

strument can generally be passed with comparative facility. They are generally very readily cured by rapid dilatation, though some prove quite rebellious. That strictures of the second class, or simple fibrous variety, situated in the spongy urethra, may be permanently cured has been abundantly demonstrated. To Dr. Otis all credit is due for the brilliant results obtained by dilating internal urethrotomy.

That this class of strictures may be cured by gradual dilatation, I think, is unquestioned—that they usually are not is generally conceded. The length of time required to effect a cure is so great in strictures of small calibre that few patients are willing to give the treatment the necessary time and care. I have little faith in electrolysis. The method of treatment which I prefer is dilating internal urethrotomy with Dr. Otis's dilating urethrotome. Where the stricture is of small calibre a certain amount of dilatation must be obtained before the instrument can be used. This, however, is generally very readily accomplished. The operation, with the proper attention to detail, and aseptically performed, is almost if not quite as safe as gradual dilatation. Otis has done the operation hundreds of times without a fatal result. Other operators have obtained equally good results. Under cocaine anæsthesia the operation is painless.

Before operating I always immerse all the instruments which I may need in a three per cent. solution of carbolic acid for at least half an hour preceding the operation, so as to render them thoroughly aseptic. I next thoroughly cleanse with a stiff brush, soap and water all the parts of the patient with which my hands or instruments must come in contact, and disinfect them with a 1 : 1000 solution of bichloride of mercury. In other words, I prepare the parts just as I would for an amputation.

I always make a careful examination of the urine before any operation within the urethra.

When there is a urethral discharge, I wash out the urethra with a warm saturated solution of boric acid. The instruments are taken out of the carbolic solution and dipped in

boiled water or Thiersch's solution, to remove the acid before introduction into the urethra. I then perform the operation in the usual way, first ascertaining the extent and location of the stricture and the normal calibre of urethra. I always, except in strictures of the first inch, cut the roof of the urethra up to the full size of its normal calibre, as indicated by the urethra-meter. All constricting bands should be cut. The after-treatment consists of the introduction of bougies every third or fourth day, with saline laxatives and diuretics, as indicated, to keep the bowels well open and the urine bland and unirritating. The after-introduction of sounds is an essential part of the treatment, for it allows the cut to fill up from the bottom with granulation tissue instead of simple adhesion of the cut surfaces, which would otherwise occur. This granulation tissue is finally covered with epithelium, and the cure is complete.

Case I.—W. W., single, æt. twenty-eight, white, robust physique. Had gonorrhœa three years previously, lasting for several months. Complained of pain on micturition, inability to empty urethra completely, lessening of stream, etc. On examination I found two tough fibrous strictures, one just posterior to the fossa navicularis, the other, two and one-half inches from the meatus. Both strictures were cut up to 33, the anterior one on the floor of the urethra with the meatatome, the posterior one with the urethratome on the roof of the urethra. These strictures were associated with intense spasm of the cut-off muscle and excessive hyperæsthesia of the urethra. The patient was cured without an unfavorable symptom. From a thorough examination made several months after treatment was suspended, I am satisfied the cure is permanent.

Case II.—W. I., single, æt. twenty-eight years, white, nervous temperament. History of gonorrhœa six years previous, lasting eighteen months to two years. Typical history of stricture. On examination, found small meatus, admitting No. 20 French, and three tight organic strictures; one just posterior to the fossa navicularis, another two and one-half inches from the meatus, and a third just anterior to the bulb. Cut up to No. 33 French. After-treatment same as Case I. Have examined patient several

times since treatment was stopped, and there is no tendency to recontract, a full-sized sound passing in without obstruction.

Case III.—A. F., single, æt. twenty-two years, white, chronic gonorrhœa, with recurrent exacerbations extending over a period of three years. Examination revealed a peculiar hypospadic malformation. On superficial inspection the meatus seemed to be normal, but on looking closely I found what at first appeared to be the meatus was only a slit about a line in depth, while the opening was underneath the glans just in front of the frænum. After slitting up the meatus I detected a tortuous stricture occupying the anterior four inches of the canal, and cut it freely up to No. 34 French. The discharge from the urethra was considerably increased by the operation, but subsequently ceased entirely. The patient, who was a physician, was under my care only three weeks, preferring to conduct the after-treatment himself, as his home was out of the city. I have had several letters from him since he passed out of my hands, which seem to indicate a complete cure.

Case IV.—Married, white, æt. thirty. History of gonorrhœa ten years before, lasting several months. Gonorrhœa was cured with difficulty. Gradual diminution of stream with pain and other symptoms of stricture. Very small meatus, admitting No 15 French. After incision of the meatus I found two very tough fibrous strictures of almost cartilaginous consistency, situated respectively one and one-half and four inches from the meatus. The strictures were so tough that it required very considerable force and several incisions before the constrictions were thoroughly relieved. With the exception of persistent hemorrhage and extravasation of blood, the patient made an excellent recovery.

I might report a number of other less tedious cases, but as there are no features of especial interest, I will not do so. The cases reported were strictures of very tough fibrous, almost cartilaginous consistency.

Similar cases treated by gradual dilatation have not terminated so favorably. I do not believe I have permanently cured a single fibrous stricture by this method of treatment.

Strictures of the membranous urethra are seldom radically

cured by any method of treatment. Here internal urethrotomy is never advisable, on account of the great danger of hemorrhage and the impossibility of cutting with any degree of accuracy. Divulsion is unsurgical and dangerous. Here we must, in the majority of cases, content ourselves with gradual dilatation up to as near the normal calibre of the urethra as possible, and then the occasional introduction of proper-sized instruments indefinitely. External urethrotomy offers somewhat better results, not a few being permanently relieved by the operation or by a combination of the external and internal operations. I have treated all the cases that fell into my hands by gradual dilatation. In none of the cases have I been able to effect a radical cure except, perhaps, in one case of soft stricture.

The deep inodular strictures are not curable by either of the above methods. Only relative relief of the symptoms need be expected.

The operations of excision, with transplantation of healthy mucous membrane, or excision of the entire stricture and suturing together the ends of the severed urethra, have been successfully performed. Theoretically the operations seem to meet the indications. The results obtained thus far apparently warrant the performance of the operations in appropriate cases.

Dr. E. L. Keyes, in a paper read before the American Association of Genito-Urinary Surgeons, at Newport, May 21st, and published in the *New York Medical Record* of May 25, 1889, reviews the operation.

The indications to be mét in the treatment of urethral stricture are: (1) to set up an active inflammation in the place of the chronic inflammation which always exists in the stricture; (2) to restore the mucous membrane to its original condition.

An operation which would fully meet these indications would be an ideal operation. We can, with our present methods of treatment, only approximately restore the tissues to their normal condition.

WHAT CIVILIZATION IS DOING FOR THE HUMAN FEMALE.

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At the outset of this paper the writer wishes to disclaim having any grudge against civilization. On the contrary, he enjoys the luxuries and comforts which it affords him, and in return is quite willing to pay the price in shortness of life and diminished health, which it demands.

The object of this paper is merely to call attention to the fact that civilization is slowly but surely working certain changes in the human animal. His wish is to record, not to criticise. As his observations have been made upon the human female, he will limit his remarks as much as possible to that branch of the subject.

For the purposes of this essay the word civilization will be taken to mean the ensemble of social customs, habits, refinements of manners, comforts and luxuries which are not practised or enjoyed by human beings in the savage state.

That these altered circumstances are changing the nature and health, as well as giving a different complexion to the diseases of women, is tolerably well known. The writer will endeavor to point out in what manner this is coming to pass. In the savage state the human female possesses a muscular system quite equal to, and in some countries where it is the custom for the women to perform all the hard work, even stronger than the men. When the tribe is moving from one point to another in search of food, she has not only to transport herself, but also one or two, or even more, of the smaller

children, while when stationary for a time it is her duty to grind the corn, gather fuel, carry water, and cultivate the ground in a rude way, while the men occupy themselves with warfare or the chase. In such women there are no muscles that are never called into play, and all the physiological processes are carried on with regularity and ease.

Under the influence of civilization the woman gradually exchanges her life in the open air for close confinement in the house, with its deprivation of fresh air and exercise, and instead of a light waist-cloth or a simple covering suspended from the shoulders, she has gradually acquired the art of changing her form from the natural to the artificial shape, and to hang from her constricted waist not only a large amount of heavy clothing, but also many hundred yards of ornamental trimming.

In the savage state the female child is born with equal chances with the male. The daughter of civilization, on the contrary, inherits at her birth the diminished lung capacity and breathing power of her highly educated mother. From the age of two or three till ten or twelve she is treated pretty much the same as her brother, although both are too often treated badly enough, being kept in close confinement in a poisonous atmosphere for many hours a day when they should be running about in the pure air. About the age of puberty, however, the civilized female becomes heavily handicapped, for she is then taught that any but the slightest movements are ungraceful, and in order to give her a so-called nice figure she is fitted with a corset—a sort of irregular-shaped band which is so tightly laced around the middle of the body as to prevent the lower ribs and diaphragm from acting. This gives rise to a limited form of breathing known as costal respiration, which was formerly thought to be natural to all women. Owing to the experiments of Kellogg, it has been established that among women who have never worn corsets there is no such thing as costal respiration as opposed to abdominal respiration. On the contrary, they use the abdominal breathing just as much as men do.

Not only does the corset diminish the effectiveness of the lungs, but indirectly it lessens the nutritiousness of the blood by decreasing its supply of oxygen. Beside that, it directly interferes with the usefulness of the blood in another way: the compression of the chest by the corset actually limits the diastole of the heart. We have only to remember that the heart has no power of its own to dilate, but merely expands by the very slight *vis a tergo* of the blood flowing in from the large veins, to understand why syncope and death from this cause are by no means rare.

Congestion and enlargement of the liver are important factors in the production of diseases of the female pelvic organs. Here again the corset and civilization have much to answer for. In the normal woman the diaphragm is free to rise and fall, alternately drawing in and forcing out the blood; without this suction action of the diaphragm the liver becomes congested. This means enlargement. At the same time the enlarged organ is forced back against the spine so as to compress the inferior vena cava, which passes behind it. As this vein receives all the blood coming from the internal generative organs, compressions of the inferior vena cava must cause congestion of the womb and ovaries.

That the corset must hamper the peristaltic movements of the intestine is evident, leading to constipation, malnutrition, and poisoning of the system, which Sir Andrew Clark, with his happy faculty of calling old things by a new name, has termed fecal anæmia.

Apart from the pressure of the liver upon the main venous trunk, the passage of blood and lymph from the uterus and ovaries, already battling against heavy odds in the shape of gravity, has still further to contend with the artificial strictures at the waist, so that the large, loose plexus of veins lying between the folds of the broad ligament, known as the pampiniform plexus, is frequently over-distended with blood, amounting to varicocele, and causing excruciating pain. Many a time the removal of the corset would render unnecessary the removal of the ovaries. Some writers have denied the exist-

ence of varicocele of the broad ligament, which the writer was one of the first to describe, and which he has not the slightest doubt is a much more common disease among women than varicocele of the spermatic vein among men. In several previous papers he has called attention to the greater frequency among women of pain in the left side, and to the explanation of it, partly by the fact that the left ovarian vein, like the left spermatic, empties into the left renal vein at right angles to the current, and consequently at a disadvantage; the other reason being the pressure of a loaded rectum and sigmoid flexure upon the left common iliac vein, as well as on the left ovarian, as they pass between the bowel and the brim of the pelvis.

The evils of the corset are very much increased by the error of suspending the greater part of the clothing from the waist, instead of from the shoulders, as men do. The clothing of a fashionably dressed civilized woman, in winter street costume, has been estimated to weigh thirty-seven pounds, nineteen of which hang from the waist, so as to increase abdominal pressure. It is needless to add that less than half of that weight, if judiciously laid out, would answer all the purposes of covering and warmth.

During many hours a day for many years civilization requires that the female child should be kept at a desk, supporting the weight of her head and shoulders on her left arm, while the right is employed in writing. The result is atrophy of the dorsal muscles of one side with lateral curvature. At the age of puberty the corsage is applied, when the dorsal muscles of both sides, having their work done for them, atrophy in accordance with the physiological law, in virtue of which unnecessary organs disappear. These erector spinæ muscles then disappear, as may be seen by the spines of the vertebræ becoming prominent, instead of being buried in muscle, as they are in the savage state. What with street cars, cabs, railways, and elevators, the muscles of the limbs are hardly used at all, and they atrophy. The levator ani, the principal muscle of the pelvic floor, and therefore sometimes called the

pelvic diaphragm, is so seldom called upon to raise the anus or to constrict the vulva that it, too, degenerates and becomes thin and weak. On this continent, where civilization has reached its highest phase, the muscular system has been replaced by fat and nerves, principally nerves. As Dr. Herman, of London, says (*British Medical Journal*, June, 1889): "Under civilization, a new type of disease has sprung up among women who are accustomed to have everything done for them and to do little themselves; persons who think and feel a great deal, but act little. Over-sensitive nerves and weak muscles," he says, "are partly inherited and partly the result of training; of a training which, instead of making the child into a good animal, has been, perhaps not intentionally, directed toward developing the mind and hindering the growth of the body; a training which develops complexity of nervous structures, instead of nervous energy. It is the result of a childhood spent in learning a great deal and doing very little." Instead of training women to be tall, strong, and muscular, with good appetites and the power of sleeping well, the whole tendency of civilization is to depress and mortify the flesh in order to exalt and cultivate the spirit.

This supremacy of the nervous system amongst the most highly civilized women gives a peculiar complexion to almost all their ailments—their symptoms, as a rule, being altogether out of proportion to their actual disease; for instance, when the muscles which support the uterus are a little tired, instead of a feeling of fatigue, the highly civilized woman complains of unendurable pain, so that slight functional disorders are frequently subjected to treatment which should only be required for severe organic disease. Nervous sedatives have become so necessary, that in one town in the United States the writer has seen half a dozen ladies come into a drug store within half an hour and consume a dose of bromides on the premises. They appeared to be regular customers. This hyper-irritability of the nervous system is so prevalent among the most highly civilized people, that domestic happiness is not so common as it once was. The writer would suggest

that bromide of sodium should take the place of common salt upon the table of this continent.

If civilization with its luxury and ease, and the possibilities which its accompanying wealth gives women of having things done for them instead of doing them themselves, make women more sensible to pain and less capable of exertion, it would not be surprising to learn that such a complex process as labor, depending as it does upon the nervous and muscular systems, should be affected injuriously thereby; such indeed has been the writer's experience. The process of dilatation of the os uteri which, among savage and slightly civilized women goes on quietly and without sufficient pain to prevent them from attending to their occupation, becomes in the highly civilized a long and agonizing process, owing to their increased sensibility with diminished contractility. Their muscles make a great outcry but do very little work. Owing to defective nutrition the amniotic membrane breaks very often at the very beginning of labor, so that the waters escape and dilatation must take place by the direct pressure of the child's head instead of by the beautifully equalized pressure of the bag of waters. The pressure of the child's head being greater at certain points than at others the stretched cervix is lacerated. In the writer's opinion laceration of the cervix could not possibly occur if dilatation were performed by the bag of waters, and if neither fingers nor instruments were introduced within it. If the bag of waters were strong enough to remain intact until the perineum is also dilated, as he has seen it occur among the lower classes in Canada, rupture of the perineum would not happen either. The writer does not think that the importance of preserving the amniotic membrane until dilatation is complete is sufficiently understood. There are even text-books which recommend wilfully rupturing the membranes before dilatation is finished. The rupture of the membranes really retards labor, tempts the attendant to make many injurious examinations, followed at last by the application of the forceps very often before dilatation of the cervix is complete, because the woman is exhausted, and

causing rupture of the cervix. Then the head is dragged through the perineum without allowing as much as a tenth part of the time which nature requires for its stretching. Then, again, civilization makes the parturient woman remain for from ten to twenty days on her back with the discharges accumulating in the pelvis, or leaking through the Fallopian tubes into the peritoneal cavity, instead of having her up and about all the time with the uterus well drained, as in savage women, among whom puerperal salpingitis, ovaritis and fixation of the uterus by local peritonitis are unknown. Apart from the injudicious rupturing of the membranes, labor is prolonged in the civilized woman owing to the badly nourished condition of the muscular tissues of the uterus and abdominal wall.

In yet another way is civilization making labor more laborious. According to the law of the survival of the fittest, a woman with a pelvis narrower than the average, if left to Nature, would probably perish in her first confinement, so that that breed of women would at once die out. By the intervention of art, women with small pelves are preserved to give birth to many children, of which some will be females with pelves even smaller than their mother's. It is true the removal of the uterus, as recommended by Lawson Tait, now that it can be done with so much safety, would put a stop to such vicious breeding.

On the other hand, civilization, while it is making the pelves of women smaller, is making the heads of male infants larger; for, in the struggle for existence, the man with the big head, and not the one with the strong arms, wins the battle of life. As every new idea that enters a man's head occupies brain space, it is tolerably certain that the average circumference of the male head is increasing. As male children inherit the qualities of their fathers to a greater or less degree, some of the big-headed man's offspring will be born with larger heads than their father had at his birth.

While Nature, if left to herself, would exterminate at their

birth these big-headed men who are able to amass so much wealth, civilization comes to their rescue and saves them.

We now come to a delicate question, but one which no feelings of false modesty should prevent us from looking squarely in the face. There can hardly be one physician here who has not been consulted either by a wife, or by a husband for her, on account of lack of sexual feeling. Anyone who has had a large experience with highly civilized women cannot have failed to learn that very few of them care anything for sexual intercourse. It may be argued that those who come to consult the physician for frigidity are sick women; but, in order to ascertain the truth on this point, the writer has had inquiries instituted among healthy women, and the result has been the same; that the higher one rises in the grade of civilization, the less the sexual instinct remains. This is partly the result of training, by which the civilized female is taught from her earliest years to repress every resemblance to the healthy animal, and partly the result of heredity, as will shortly be seen.

As sexual feeling in the woman is in no wise necessary for the preservation of the species, and as the women who have no such feelings are, perhaps, the best off, the writer does not complain of this condition of things. He merely wishes to record the fact that a great change is coming over women in that respect. It is easy to explain this by the aid of the Darwinian theory, one of the axioms of which is that qualities which are not necessary or advantageous to propagation and preservation will die out, while those which are advantageous will be preserved.

Now, if there are two daughters in a family, one of whom has a strong predilection for men and the other cares nothing for them, and if only one of these girls is to be married, the highly civilized man will, for reasons easily imagined, choose the latter, who will have several daughters who will inherit their mother's qualities in a varying degree. The former, on the contrary, though a great favorite, is not married and dies childless. Applying the same rule to several succeeding gen-

erations we will see that under civilization the sexual feelings will gradually die out among women. The same rule does not apply to men, for in them reproduction is an active process, and only those men have progeny who have strong sexual feelings. For, owing to the keenness of the struggle for existence, in greater part due to extravagance, no man will enter into the expense and responsibilities of matrimony unless compelled to do so by the force of his sexual feelings. Men who have little or no passion, on the contrary, die childless; so that that class of men are dying out, while there survive only the men who have inherited strong sexual propensities. So, if the argument is clear, it will be seen how men are becoming more passionate while women are becoming less so. The writer knows of several families where for three generations the process of losing sexual feeling among the females, and of acquiring it more strongly among the males, has been steadily going on.

For the sake of clearness, these thoughts have been presented very briefly; and although the writer does not wish to criticise, we can hardly fail to learn a lesson from them.

The lesson to be learned by the study of these facts is that the majority of diseases of women which we are called upon at the present day to attend were not only not known, but did not exist among the women of four centuries ago.

That most of them are but the logical and to be expected outcome of the altered and vitiated circumstances by which civilization is surrounding them.

That the first step to be taken in their treatment is to undo as far as we can in one generation the wrong that civilization has done to their bodies. And that we should use all the influence we possess to save the coming generation of women from the mistakes and consequent suffering of the present one, and which education, luxury, and fashion are busily at work preparing for them.

LAPAROTOMY FOR EXTRA-UTERINE PREGNANCY.

By Waldo Briggs, M.D.,
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In this age of progressive abdominal surgery, I consider the condition of extra-uterine fœtation and the operation of laparotomy for the removal of the fœtus, or the fœtal products, one of great interest to surgeons.

My object in selecting this subject was not to advance anything new in this field, but to elicit a discussion as to the proper method of dealing with this condition by the operation of laparotomy, with special reference to a case operated upon.

The removal of an extra-uterine fœtus by opening the abdomen where an abscess had formed is a very old operation, but the incision into an abdomen devoid of inflammatory action is of recent date, and has created considerable interest as to the proper method of dealing with the placenta and the subsequent treatment of the case.

It is not necessary for my object that I should enter into the diagnosis of this condition, from the fact that in the early months of pregnancy, before the fœtal movements are discerned, it is attended with many difficulties, the discussion of which would make this paper unnecessarily long. Nor shall I say anything concerning the causation of this condition.

Every case of extra-uterine pregnancy where the development has reached a sufficient size for a diagnosis to be easily made, must be of special interest when the risk, immediate or prospective, is taken into consideration.

The propriety of operating at once, or of awaiting further

developments, and the possibility of the rupture of the cyst, which would outweigh the risk of primary operation, should be considered.

It is known that ovarian, tubal, and abdominal fœtation are the prominent varieties, and from the anatomical structure of the ovaries and Fallopian tubes that the possible distensibility would not be so great as to contain a fœtus over the third or fourth month. The ultimate result would be over-distention, with rupture, followed, in the majority of cases, by hemorrhage into the peritoneal cavity, and death from peritonitis or septicæmia.

In the rare form of abdominal fœtation there is not as much danger from hemorrhage, and we might wait until the maturity of the child before making laparotomy, with a prospect of saving both mother and child.

So, in considering the advantages of laparotomy in these three varieties of abnormal fœtation, it is my opinion that laparotomy is indicated in each; in the tubal or ovarian variety as soon as the diagnosis is made; in the abdominal when the child is viable, provided urgent untoward symptoms do not demand immediate attention.

A case of the latter variety, or I might term it "tubo-abdominal," occurred in my practice, about six months since.

The patient was of German birth, twenty years of age, and unmarried. She became pregnant fourteen months prior to my first visit. Nothing peculiar marked the earlier stages of gestation, which progressed in an apparently natural manner until the end of the ninth month. Being unmarried, when the ninth month passed without delivery, the patient and the family began to believe that the pregnancy was not real, although all the external signs were present. Toward the end of the ninth month, however, there were severe abdominal pains, which continued until the middle of the tenth month, when the sufferings became so intense that they could no longer be borne. The family physician was called, and after a careful examination diagnosed, probably, extra-uterine pregnancy, and urged an immediate operation. At this time (toward the end of the tenth month) the

beating of the fœtal heart could be plainly heard. From motives which are not known the patient and family refused to consider an operation, and the physician's skill was taxed to the utmost to relieve the constant tormina and excruciating abdominal pains. After a few visits his services were dispensed with, and the woman was sent to the Female Hospital, where she remained but a short time. She was brought home, and the family physician again called. The patient by this time was reduced almost to a skeleton; the fœtal heart-beat, however, could still be heard, and the physician again begged for an operation without avail.

About the 23d of February the fœtal heart-beat ceased, and with the death of the fœtus there was, as usual in such cases, a temporary amelioration of the agony which the patient had endured for three months. She gained in strength, and was able to walk around the room. After this change the patient and family refused surgical interference still more obstinately. The amelioration was of short duration, however. In a few days pains returned, and the symptoms became so urgent that the consent to call a surgeon, so long withheld, was given, and when determined upon was eagerly anticipated.

Such were the conditions when I was called, and such the outline of the history given by the physician, who had to depend on the patient and family for all that occurred prior to his first visit. I saw the patient for the first time about March 30th, or about fourteen months after signs of pregnancy appeared, and five weeks after the last click of the fœtal heart. She was emaciated to an extreme degree, with the abdomen enormously distended. She was rational, and thoroughly appreciated her situation. She was not only entirely willing, but eager to have something done. There were no signs of septicæmia. Examination showed the uterus to be empty, and increased somewhat in size. By palpation the fœtus could be felt lying in the abdominal cavity, the head apparently resting in the right lumbar region. The patient had been informed of the grave nature of her case, and was anxious for the operation.

I, therefore, appointed a day. The initial incision in the linea alba extended from the navel to the pubis. On entering the cavity of the abdomen the back of the child was exposed, and by manipulation the head was found in the epigastric region. The fœtus was of immense size, and before it could be removed the incision

had to be extended to the ensiform cartilage. The child lay face downward among the intestines, and, except a little band of membranous material lying across the buttocks, absolutely uncovered and loose in the abdominal cavity. The right tube was ruptured, and showed that it had withstood considerable distention before giving way. The fœtus was far advanced in decomposition, and on lifting it from its position I found portions of the intestines of a dark-purple hue, the ascending colon being almost in a state of sphacelus from pressure. Of the sac the only trace which remained in the cavity was the membranous strip which covered the buttocks, as before stated. The peritoneum was dark, and congested in patches. The dead fœtus being removed the placenta was found to be attached to the uterus, the right broad ligament, the omentum, the intestines, and the peritoneum. In the examination of the attachments there was a slight unintentional traction made upon the placenta, which being partially decomposed, ruptured, and an excessive hemorrhage ensued. Although compression of the abdominal aorta was made almost instantly, so profuse and sudden was the hemorrhage that the patient's life was almost spent before it could be controlled. The remainder of the placenta was then removed. Finding considerable hemorrhage to continue from the omentum at the points of placental attachment it was ligated, and a considerable portion removed. The cavity was then thoroughly cleansed, and the wound closed under antiseptic precautions. The patient's pulse was scarcely perceptible, but rallied under hypodermic injections of brandy. After she was put to bed hiccough, with great prostration, set in, which was momentarily controlled by ether and milk. It recurred again and again, and the patient succumbed ten hours after the operation.

The points of interest in this case are so numerous and striking that I scarcely know to which first to call attention, or what chiefly to dwell on. I may be excused, however, for mentioning the following, which occur to me as especially worthy of note:

1st. To what grade of ectopic pregnancies shall this be referred?

The attachment of the placenta would, if taken alone,

point to the abdominal, but in contradiction to this we have the distended and ruptured tube pointing to a tubal origin of the pregnancy. Here, again, we are confronted by the absence of any history of rupture—viz., hemorrhage, as evidenced by sudden acute pain and syncope, or by intense and frequently repeated rigors and acute peritonitis. In answer to this it may be suggested that hemorrhage to any extent at the tubal rupture may possibly have been controlled by pressure made by the fœtus itself. This is merely a suggestion made in a most puzzling quandary. Again, if we assume that the pregnancy was tubal, at what period in its duration did the rupture occur? We can scarcely imagine that the intense suffering of abdominal pains and tormina at the end of the ninth and first part of the tenth month can be ascribed to this cause. We would rather attribute them to the attempts of Nature to expel the fœtus now arrived at term. The evidence of the tube itself is also against this supposition, for while it showed signs of having been greatly distended before rupture, we can scarcely conceive that it could have possibly been stretched to the extent of covering so enormous a body as that of the fœtus in question.

2d. The long duration of fœtal life after term had been reached and the fœtus had passed through the false labor, for such I will assume the phenomena of the last part of the ninth and first part of the tenth months to have been, and which has hitherto been claimed to destroy its life invariably, I will say that, having carefully studied the authorities at my command, I can find no mention of a similar phenomenon.

Five months after term, and four and a half months after the last of the series of pains which I ascribe to efforts at parturition, we find the fœtal heart still beating. Not less remarkable is the period of time which elapsed between the day the last click of that heart was heard by the physician and the day of operation, without the development of septicæmia in the mother. This, in itself, is certainly not remarkable, since the usual course of these cases, where death does not occur at the period of rupture of the tube (in tubal preg-

nancy), or of the false labor (from exhaustion), or shortly thereafter (from septicæmia), is, that the fœtus becomes encysted, and becomes what Kauwenburghe calls an ancient pregnancy. But here we have a fœtus stripped of its sac or other protecting membranes, and of the immense weight of fifteen pounds, lying loosely among the intestines for ten months. Putrefaction had evidently been set up some time previous to the operation; the intestines were bruised, and mortification had commenced, and yet the only apparent effects of which we have any history up to the moment of operation were a difficulty in defecation and in retaining the urine.

4th. The causation given by all who have written upon the subject in regard to non-interference with the placenta, and which was in my mind when I took hold of the cord, is powerfully accentuated here. It is true that the caution applies to a very different class of circumstances from those with which we were then dealing—viz., to those cases where the fœtus is still living; but the excessive hemorrhage which ensued upon its rupture in this instance only shows the wisdom of the caution under all circumstances. I do not believe this hemorrhage had any effect on the ultimate result of the case, so far as the possibility of the recovery of the patient is concerned, though she might, and would, probably, have lived a few hours, or even days, longer, had it not occurred.

BRIEF OBSERVATIONS BASED ON AN EXPERIENCE OF EIGHTY-SEVEN ABDOMINAL SECTIONS.

By Joseph Taber Johnson, M.D.,
Washington, D. C.

In these days, when abdominal section is so common, it would seem almost like wasting the time of your Society to make a report of so small a number of cases as is represented by my own individual experience, when there are so many operators in this and other countries who reckon their sections by the hundred.

It is not the purpose of this short paper to make any particular report of cases, but to give the experience and impressions of the writer in regard to certain details in the *technique* of the operation and the previous and subsequent management of the patient.

Preparatory Treatment.—There will be a small number of cases occurring suddenly in the practice of all operators where no opportunity is afforded for any preparatory treatment, such, for example, as stab and gunshot wounds, rupture of the uterus and ruptured tubal pregnancy followed by alarming hemorrhage, or collapse from ruptured abscesses about the vermiform appendix, or in the pelvis. Here immediate life-saving operations are attempted, as a forlorn hope, upon patients not in a good condition, but as the only thing left to do to prevent a fatal result.

In the majority of cases, however, there is plenty of time to make all the necessary arrangements which experience has shown to be useful in bringing about the best results.

If a patient has come from a distance, as frequently happens, rest in bed for a few days has a good physical as well as mental effect. She thus gets accustomed to her changed environment before, instead of after, the operation.

Several warm baths and thorough friction of the skin with a coarse towel by the nurse is an excellent preparation, especially if the patient is from the country and unaccustomed to frequent bathing. By a few days' delay after entering the hospital or the room she is to occupy, time is given for the patient to become acquainted with the surgeon and the nurse, who are to occupy such close and peculiar relations to her for the coming two or three weeks, and for the surgeon to become acquainted with the condition of his patient's heart, lungs, kidneys, digestion, etc. Increasing experience has shown the wisdom of time thus spent.

It is within my knowledge, though not within my personal experience, that deaths have occurred which operators thought afterward they might have prevented, had they known beforehand of the existence of diseases of the heart, lungs, or kidneys.

Attention to the condition of the bowels the writer has found more and more important. Thorough and complete emptying of their contents adds greatly to the subsequent comfort and, perhaps, safety of the patient; wind colic is thus often prevented and the painful distention resulting therefrom. Liquid diet for a day or two preceding the operation helps to prevent accumulations. I have gradually learned to avoid milk as a diet for these patients, as it makes caseous and lumpy stools.

The Incision.—The shorter the incision the better for the patient; as experience increases and greater manipulative dexterity is acquired one can get along with a shorter incision than at first. The educated "finger tips" can do better for the patient many times than the eyes of the surgeon. A few operators prefer long incisions, plenty of room for their hands, and an open field for their vision. They sponge out the peritoneal cavity dry, and use no drainage tubes; but in my

experience short incisions, manipulations with the fingers, little or no sponging inside, free irrigation, and, if oozing is not arrested entirely, a glass drainage-tube gives the best results.

The shorter the wound the less time is required to make and to close it, the fewer sutures, and the less liability to ventral hernia. Time, I am more and more convinced, is an important factor in these cases. Statistics will show a greater mortality following operations which have lasted an hour or an hour and a half than in those which are completed in from fifteen to thirty minutes.

Time spent in using many sponges and many sutures is time misspent, where irrigation, a short incision and a drainage tube would have done as well if not better. By speed in operating *haste* is not to be understood. Everything that could be required in an abdominal section being in readiness, and in order and clean, emergencies not expected can be instantly met and properly treated; no time should be lost in discussions or incomplete manipulations. Every moment should count; no ground ought to be travelled over twice or three times, as one sees done by inexperienced and timid operators.

In this way speed is accomplished, nothing being slighted, and the operation is finished by a hand trained in the school of experience in twenty minutes, when another or a beginner would have occupied an hour or more. Patients *have* recovered who have been on the surgeon's table one, two, three, or even four hours, and the slow operator argues from that, that they could do no more than recover if he had completed his work in fifteen minutes; but one's experience does not require to be very large before he has sad knowledge of the fact that he would save more patients, who were kept under the influence of his anæsthetic half an hour, than as if they were kept unconscious two hours. Some hearts and some kidneys can withstand the shock of operating and the effects of ether for half an hour, when their continuance for one or two hours would prove fatal.

The inhaler used has its influence on the result. When I first began to operate I used the ordinary cone, made with a stiff towel and a newspaper. Half an hour and more has been repeatedly consumed in getting the patient sufficiently anæsthetized to bear the knife without flinching; severe struggles, much excitement, screams, and groans, alarming patients or friends in neighboring rooms, and wearying the operator, was the rule. With the Clover inhaler, which I first saw Mr. Tait and Dr. Keith use, I now get the patient under control in less than five minutes—often in three; and in an operation lasting thirty to fifty minutes, not more than two ounces of ether is consumed, and frequently less in the hands of an expert anæsthetizer; whereas, in the old way, sixteen, and frequently twenty, ounces were required.

Short incisions, rapid operations, and little ether must give better results in the long run than the opposite course; at least such has been my experience, as shown by the fact that in my first five ovarian operations I lost three cases, while in the last fifty-eight *only two* have died. Most of my abdominal sections for the past two years have been done in my private hospital, where only one death has occurred and that was from tetanus on the fifteenth day after the operation.

I have learned also, by increased experience, that it is much better, for me at least, to have the same expert give ether in all my operations, than to depend on some physician whom the friends or the patient might wish to invite for that purpose, or to rely upon a green hospital interne, whose duty it would be to give ether to the surgical cases immediately after his appointment.

All operators, I presume, have been alarmed and annoyed by the inexperience of the physician detailed to give the ether. At one time the patient would be struggling, causing the intestines to protrude, and requiring force to keep her on the table; at another time she would be breathing stertorously, and almost cyanosed, while the anæsthetizer was intently watching the operator, instead of attending to his own very important business.

Incomplete Operations.—In my early experience I met with a number of bad cases where, from lack of courage or knowledge—probably both—I failed to complete operations which I began, fully expecting to cure my patients. Fearing to proceed, I abandoned the operations. In these cases the patient's last state was worse than her first.

I have never regretted completely finishing an operation, no matter how desperate, although frequently advised to slight details, hasten through, and get the patient off the table.

Incompleteness in the details of abdominal operations has resulted in many a death. Emmet has well said "that success in ovariotomy consists in completely carrying out many details, the neglect of any one of which may prove fatal to the patient." Such haste as would cause a spurting vessel to be overlooked and left unligated in the torn omentum; as would cause insecure ligation of the pedicle; as would leave a sponge, forceps, or scissors in the abdominal cavity; as would allow blood-clots to remain in the pelvis, and not enough sutures placed in the incision—such haste and incompleteness as this all will now condemn; but all these things have happened over and over again. Increased experience shows that complete enucleation of pus tubes and pus sacs, complete separation of adhesions, making a good pedicle, secure ligation, complete removal of tumor contents and blood-clots from the depths of the pelvis, thorough and complete irrigation when required, combined with drainage, will save many more patients than timid, half-way and incomplete measures: while every moment of time should be saved, no detail, however small, should be slighted or neglected; whatever is to be done should be thoroughly and completely done at the time, leaving no steps to be retraced, no work to be gone over twice.

Closing Incision, Dressing, Etc.—Separate sutures for the peritoneum seem to be unnecessary, provided the surfaces of this membrane are thoroughly and completely coaptated by our sutures in the abdominal wall.

The sutures may be silver wire, silkworm-gut, or pure

Chinese silk. I prefer to use one kind of silk for all purposes—one size, if the pedicle is not too large.

Simplification of detail aids in shortening the time of the operation. The fewer the instruments and sponges, and fingers in wound or cavity, the fewer the chances for infection.

When I first began to operate, invited guests would feel slighted if some of them were not requested to put their surgically unclean fingers into the abdomen to confirm the diagnosis. Now a careful surgeon would feel insulted if any bystander should attempt to do so.

Experience demonstrates the wisdom of carefully spreading the omentum over the intestines before sewing up the wound. Beside restoring the natural relation of the parts disturbed by the operation, it prevents the intestines from forming adhesions to the under surface of the incision. Time is saved, and the number of needles lessened, by using, for short incisions, only one or two needles, with silk enough in each for three sutures.

Ventral hernia, which occurs in about ten per cent. of abdominal sections, is much less likely to happen if we place our sutures very near together. In Keith's later operations he recommended four to the inch, while we formerly saw them put an inch or more apart, even in long incisions.

Greater care in suturing when we use a glass drainage-tube would lessen the liability to the occurrence of this sickening and deplorable accident. One suture left united until after removal of the tube makes it possible to close entirely the unsightly hole which its withdrawal leaves gaping wide open. A woman with a large ventral hernia is nearly as uncomfortable as before the operation. While it is not so dangerous to life, it often causes more discomfort than an ovarian tumor.

A simple antiseptic dressing, and a many-tailed bandage, snugly pinned on, will make any further examination of the parts unnecessary for a week, provided the pulse, temperature, and general condition of the patient indicate a normal convalescence.

If a glass tube is in, greater care will be necessary in restraining the movements of the patient, and it will be best to examine the tube and withdraw its contents every two or three hours. The tube has its drawbacks however; it delays the operation, prolongs the time in applying the dressings, admits germs, one would suppose, through its open mouth while being cleansed, and in four instances which have come to my knowledge a fatal result has been directly traced to its use.

In one case it was reported by one of our best operators to have perforated the rectum, in another, in equally good hands, to have perforated the bladder, in another it got broken, and in still another slipped into the cavity and was lost.

In many cases bits of omentum have gotten into its central or some of its smaller openings, and made its removal difficult or impossible without lacerating vascular tissues. It may also lay the foundation for ventral hernia. The slighter union of the edges of the opening left after removing the tube forms the weakest link in the chain of union. Yet, with all its faults, I love it still. I am perfectly sure that it does more good than harm. Its faults are mostly apparent by mismanagement. Several of my patients would scarcely have lived without it, but I am convinced that, with the drainage-tube, constant vigilance is the price of safety. With care in placing it, care in suturing, much care in applying the dressings, more care in frequently pumping out the fluid through it, and constant vigilance on the part of the surgeon and nurse, much good is accomplished which would be impossible without it. Experience abundantly shows that many lives are now saved by timely desperate operations requiring much irrigation, which are only possible on account of drainage, carefully and thoroughly carried out. Ruptured cysts and abscesses, internal hemorrhages and suppurative peritonitis are now safely operated upon and the débris completely removed through irrigation and drainage.

To secure accurate information, while frequent visits are advisable, the patient should be let alone as much as possible.

One nurse, one doctor, and no visitors for the first week. A glance at the nurse's record and the patient's face is frequently all that is necessary to assure us that everything is going well. I have learned by experience that long visits, many anxious questions, frequent examinations of the wound and general medication do much more harm than good.

Saline purgatives on the third day, sooner if evidences of peritonitis are threatening, and no opium, give me better results than the opposite course.

I am convinced that the sum of the pain suffered by the patient is less if no opium is used, than as if she were plentifully supplied with this fascinating but deadly drug, as was once, and is now, too much the custom.

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